

# ANIMAL KEEPERS' FORUM



**JULY 2010**

**The Journal of the American Association of Zoo Keepers, Inc.**



**ANIMAL KEEPERS' FORUM**, 3601 S.W. 29th St., Suite 133, Topeka, KS 66614-2054

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**July 2010**  
**Vol. 37, No. 7**

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Animal Keepers' Forum is published monthly by the American Association of Zoo Keepers, Inc., 3601 S.W. 29th Street, Suite 133, Topeka, KS 66614-2054. Ten dollars of each membership fee goes toward the annual publication costs of Animal Keepers' Forum. Postage paid at Topeka, KS.

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36th Anniversary - 1974 - 2010

## MISSION STATEMENT

(Revised April 2009)

American Association of Zoo Keepers, Inc.

*The mission of the American Association of Zoo Keepers, Inc. is to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.*

*This month's cover features a drawing of a Red Wolf (Canis rufus) drawn by Chris Crowe, a keeper at the National Zoo's Conservation Research Center in Front Royal, VA. Red wolves are mostly brown, black and tan but are named for the reddish fur that is sometimes found on their ears, muzzle, and legs. Adult red wolves weigh between 45 and 75 lbs, are 4.5 feet long and stand 26" high at the shoulder. Red wolves typically live in packs of 5 to 8 animals made up of a breeding adult pair and their offspring. They feed on deer, raccoons, and small mammals. Red wolves originally roamed the southeastern United States from Pennsylvania south to Florida and west to Texas. By 1970, extensive predator control and loss of habitat had reduced the species to less than 100 animals found only along the border of coastal Louisiana and Texas. A new threat to the few remaining red wolves was identified when the wolves, unable to find each other to mate, began to hybridize with coyotes. The Point Defiance Zoo in Washington began captive breeding and produced the first captive litter in 1977. To save the species from extinction, the decision was made to capture the few remaining wild wolves for a captive breeding program in 1980. The plan was to maintain the species in captivity and eventually reintroduce wolves when a suitable release site was located. Of the last wild red wolves brought into captivity, only 14 founders qualified as pure red wolves. In 1987, the red wolf was reintroduced to Alligator River National Wildlife Refuge which became part of their 1.7 million-acre recovery area in northeastern North Carolina. Following the success in northeastern North Carolina, a second red wolf reintroduction was attempted in the Great Smoky Mountains National Park in North Carolina and Tennessee from 1991 to 1998. This effort was terminated due to the low survival of pups caused by poor nutrition and disease and the propensity of wolves to leave the park in search of prey. In 2002, the U.S. Fish and Wildlife Service and the North Carolina Zoo began increasing the genetic diversity of the wild red wolf population by fostering captive-born wolf pups into wild dens. Being raised by wild adult wolves also raises the chances of the captive-born wolves surviving in the wild. Although rescued from the brink of extinction, red wolves still remain one of the rarest species in the world. Illegal shooting is by far the biggest cause of red wolf mortality and collisions with vehicles are the second leading cause of mortality. There are currently less than 100 red wolves in the wild and over 150 at accredited zoos and institutions. Thanks, Chris!*

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for AKF. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the editor. The editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone, fax or email contributions of late-breaking news or last-minute insertions are accepted as space allows. Phone 785-273-9149; FAX (785) 273-1980; email is [akfeditor@zk.kscoxmail.com](mailto:akfeditor@zk.kscoxmail.com) If you have questions about submission guidelines, please contact the Editor.

**Deadline for each regular issue is the 10th of the preceding month.  
Dedicated issues may have separate deadline dates and will be noted by the editor.**

Articles printed do not necessarily reflect the opinions of the AKF staff or the American Association of Zoo Keepers, Inc. Publication does not indicate endorsement by the Association.

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BFR Website: <http://aazkbfr.org>**



# Scoops & Scuttlebutt



## Check Out the New Resources Available in Member's Only

If you haven't checked out the Member's Only section of the AAZK website recently, you're missing out on a treasure trove of resources. Downloadable pdfs of all of the papers, posters and workshops from the 2006 (Chicago), 2007 (Galveston) and 2008 (Salt Lake City) AAZK Conference and 2009 (Seattle) are now available. We have also been scanning past proceedings (prior to 2006) into pdfs and currently available are the following years:

***Northwest Passages: Frontiers in Zoo Keeping:*** Portland, Oregon; September 12-16, 1999

***Amoebas to Zebras: A Space Odyssey:*** Toronto, Ontario, Canada; September 30-October 4, 2001

***Branching Out:*** Kansas City, Missouri; October 6-10, 2002

The Member's Only now contains a listing of all AAZK Chapters (searchable by State), a listing and links to all AAZK Institutional and Commercial Members as well as Conservation Partners; downloadable pdfs of past columns including People Skills for Animal People (new installments currently being added) and The Water Column; the Australasian Society of Zoo Keeping Husbandry Guidelines; The Keeper's Role in Zoo Animal Health by veteran zookeeper Judie Steenberg; Zoonotic Diseases Handbook; Zoonotic Disease Transmission and Bloodborne Pathogens; past and current editions of AAZK INSIGHT e-newsletter; the International Congress on Zookeeping Newsletter; information on how to form an AAZK Chapter; the AAZK Operations Manual, and information on all AAZK Committees. Recently added is a link to the Keeper Accommodation List (under Chapters).

Also please keep in mind that the AAZK Discussion Boards are no longer on the public pages but are only accessible to AAZK members through the Member's Only section of [www.aazk.org](http://www.aazk.org).

Recently also added are Guidelines for Submitting an article for *Animal Keepers' Forum*.

Remember, in order to access this portion of the website, you must register as a user. This is a simple process, just follow the prompts. Please remember that changing an address on the Member's Only section **does not change** your address for receipt of your monthly issue of *Animal Keepers' Forum*. To change your address on the AAZK database for mailings, either go to the link on the Reminder Bar of the homepage, send an email to AO at [aazkoffice@zk.kscocmail.com](mailto:aazkoffice@zk.kscocmail.com), or call to leave new contact information at 785-273-9149.

All "user applicants" for the Member's Only section must be approved as valid AAZK members and this is done each weekday from AO. There is lots of good information and resources, so if you haven't registered yet, do so soon and don't miss out on these special features available only to active AAZK members.

## AAZK Chapters Help Underwrite AKF Production

During the 2010 Chapter Recharter process earlier this year, five AAZK Chapters generously sent in donations to help cover the costs associated with the production of *Animal Keepers' Forum*. We would like to thank them for their support in producing the Association's monthly professional journal.

For the July 2010 issue of *AKF* we wish to thank the Utah Chapter AAZK located at the Hogle Zoo in Salt Lake City, UT. A capsule description of their Chapter and its activities follows on the next page.

Utah Chapter AAZK was founded in 1989. We celebrated 20 years as a Chapter in 2009! Our organization has historically been made up of keepers from Utah's Hogle Zoo in Salt Lake City, UT. In recent years we have added members of the Tracy Aviary, and in the future we hope to work with keepers at the Living Planet Aquarium. Our mission as a Chapter is to advance animal care and raise funds for local and global conservation efforts.

The last five years have been incredibly busy for Utah Chapter AAZK. We hosted the National AAZK Conference in 2008. It was a huge challenge for our Chapter, and one we feel proud to have pulled off so well. The things we learned are invaluable to our future goals. Since the conference, our focus has been on expanding our fundraising, increasing our membership base, and continuing our commitment to keeper education.

Utah Chapter AAZK holds several annual fundraisers. Our 19th Bowling for Rhinos event was held on April 30th. We also do "Flamingo Flocking" through the spring, in which members of the community pay a fee to have a large flock of plastic lawn flamingo placed on their friend's lawn. The funds from "Flocking" are designated for our Heidi Harmon Professional Development Fund, which is used to send members to conferences and workshops. During the winter holiday season, we partner with a local fair trade store to do a shopping night, and participate in gift-wrapping at Barnes and Noble. In 2010 we will be holding our first 5K run on October 2nd. Called Wild Stampede, the run will fund a different conservation organization each year. This year we have decided to donate the proceeds to Action for Cheetahs in Kenya (ACK), an organization founded by a former Hogle Zoo employee and Utah Chapter AAZK member.



One of the Chapter's more recent projects is to become a partner with a new group called Wild Aware Utah. One of the founders of this new organization is also a Chapter member. The goals of Wild Aware Utah are to educate community members about the wildlife they may encounter, and how to live in harmony with those animals. We have donated money for start-up costs, and in the future may participate in neighborhood surveys and education response teams for areas that have had bear or cougar sightings. Utah Chapter AAZK feels that it is important to be involved in conservation at the local level, and this partnership will allow us to have a direct impact on the community and local wildlife.

For more information about our Chapter, visit our website at [www.utahaazk.org](http://www.utahaazk.org).

## *Call for Papers*

We are looking at putting together a special issue of *Animal Keepers' Forum* on Climate Change and Its Effects on Animal and Plant Species. We will be working with Polar Bears International on arctic global warming topics and with authors from [www.AmphibianArk.org](http://www.AmphibianArk.org) on issues affecting the amphibian taxa. We invite other interested authors to submit papers dealing with some aspect of climate change, research into species' decline, or other topics germane to this issue. You may find submission guidelines for AKF at [www.aazk.org](http://www.aazk.org) or contact the editor for information. We are looking at trying to produce this issue in December 2010 if we receive sufficient material.

◆ **Deadline for submission of articles is 1 October 2010** ◆



# ***NATIONAL ZOO KEEPER WEEK PROCLAMATION***

WHEREAS, worldwide animal populations are declining at an alarming rate with many facing extinction; and

WHEREAS, zoological institutions have become the final hope for many endangered species recovery programs through conservation research, release programs, and by being a portal through which the general public can view and appreciate disappearing wildlife; and

WHEREAS, zoological institutions are also population managers of keystone and cornerstone species, emphasizing the restoration of not just the endangered species, but a restoration of the delicate balance of nature; and

WHEREAS, zoo keepers are the frontline soldiers for conservation, participating in the battle for species survival and preservation of the natural homelands of the animals they care for through public awareness, education, and exhibition; and

WHEREAS, zoo keepers have become animal caretakers devoting their lives to caring for these animals; and

WHEREAS, zoo keepers have become the spokespersons for vanishing wildlife, carrying the conservation message of habitat loss, endangered species, and preservation of nature's threatened wildlands to the public; and

WHEREAS, zoo keepers have become animal specialists, as educators, choreographers of animal behaviors through enrichment, behavior managers through operant conditioning, and reproductive specialists through improved observations and husbandry; and

WHEREAS, to help increase public awareness about the need to preserve our precious habitats and the animals which inhabit them and to recognize the roles that zoo keepers play in animal conservation and education, The American Association of Zoo Keepers invites all AAZK Chapters to participate in National Zoo Keeper Week.



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*July 18 - 24, 2010*

# From the Executive Director . . . .

The last time we spoke, I filled you in on the realities of getting older and the deteriorating effects of animal keeping on my ability to hear. Let's keep traveling down the same road.

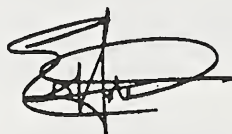
As you know, you have one of the best and most coveted jobs in any profession. Working with exotic animals is rewarding, exciting, and challenging. For the most part, you work independently, and most of you, in the great outdoors. Ah..... the great outdoors, fresh air and sunshine.

Today, I returned from the dermatologist after getting numerous pre-cancerous lesions excised from my face, neck and arms by a process called cryotherapy or cryosurgery, where the doctor freezes the offending lesion with liquid nitrogen. It's not painless, but it beats the traditional surgical alternative and the resulting scabs are really ugly for about a week.

I spent almost 25 years in the great outdoors under the unrelenting effects of the sun. Though I have been coached from childhood to apply sunscreen, it never seemed important at the time. Now – it's too late and the piper is being paid.

In your profession, it's never too late to apply sunscreen and wear the appropriate head covering, even in the winter. Sun screen of at least 30 SPF will help protect you so that in the twilight of your career, you will not have to deal with skin cancer screenings and treatments.

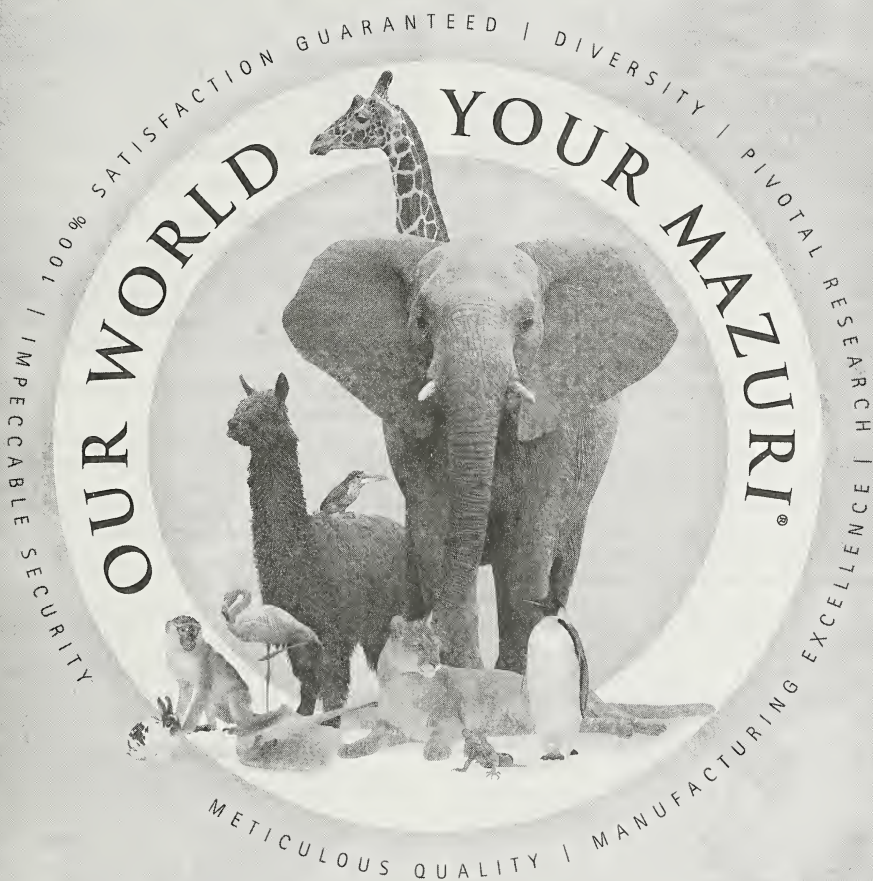
This is an easy subject to push to the back of your mind as you align the safety priorities of your profession because the effects are not acute; the effects are chronic and build over your career. Plan and act now, for a healthy life later on.



Ed Hansen  
AAZK Executive Director







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# Coming Events

Post Your Coming Events Here  
email to: [akfeditor@zk.kscoxmail.com](mailto:akfeditor@zk.kscoxmail.com)

**August 22-26, 2010 - AAZK National Conference.** Hosted by the Philadelphia AAZK Chapter and the Philadelphia Zoo. Conference information, program schedule, online registration and hotel info available at [www.philadelphiaaazk.org](http://www.philadelphiaaazk.org). A reminder that a \$50 late fee is applied to registrations after 22 June 2010.

**August 30 - September 3, 2010 - 7th International Penguin Conference** - in Boston, MA. Hosted by The New England Aquarium. For info email [ipcoston@neaq.org](mailto:ipcoston@neaq.org)

**September 1 - 5, 2010 - IUCN XIth International Otter Colloquium.** Held in Pavia, Italy. For further info: <http://www.internationalottercolloquium2010.eu/>

**September 11-16, 2010 - AZA 2010 Annual Conference.** Hosted by the Houston Zoo, Houston, TX. See [http://aza.org/ConfWork/AC\\_Intro/index.html](http://aza.org/ConfWork/AC_Intro/index.html) for further information.

**September 7-12, 2010 - National AZAD Conference** Hosted by Brookfield Zoo, Brookfield, IL USA. Call for Papers--Share your ideas by presenting a paper addressing ways people can work to conserve our Earth and all the gifts it gives us. For further information see <http://www.azadocents.org/>

**September 27-30, 2010 - AZA Orangutan SSP® Workshop** - To be held at the Denver Zoo, Denver, CO. Theme: "Conservation & Husbandry Innovations for the New Decade" Climb Up to a Higher Branch at the 4th Annual Orangutan SSP® Husbandry Workshop! - Focused on the care and management of orangutans, the workshop will bring together orangutan caregivers and managers, researchers, and field biologists to share the most current information on husbandry, conservation, and emergent issues pertaining to captive and wild populations of orangutans. Workshop registration fee is \$125. The workshop will be held in conjunction with the Orangutan SSP® Masterplan meetings which will take place on Sunday, September 26, 2010. For additional information contact Ronda Schwetz at [rschwetz@denverzoo.org](mailto:rschwetz@denverzoo.org). Online registration will be available soon at [www.denverzoo.org](http://www.denverzoo.org). Pre-Conference Trip to Cheyenne Mountain Zoo Sunday, September 26—more details soon!

**September 28-October 2, 2010 - 20th International Zoo Educators' (IZE) Biennial Conference** - at Disney's Animal Kingdom, Orlando, FL. For more information, please visit <http://www.izea.net>

**September 30 - October 3, 2010 - The 32nd Annual Elephant Manager's Association Conference** - Hosted by the Pittsburgh Zoo & PPG Aquarium. Conference will be held at the Holiday Inn Hotel and Suites Pittsburgh-Allegheny Valley-RIDC. A room block is reserved. Call (412) 963-

0600 for reservations. More details will follow on Facebook, in AZA and EMA publications and websites. Contact Terry Deluliis at (412) 365-2500 with questions.

**October 3-7, 2010 - The Aquarium and Zoo Facilities Association's 17th Annual Conference** - To be hosted by the Saint Louis Zoo in Saint Louis, MO. For further program and registration information, please see [www.azfa.org](http://www.azfa.org) or call Sue Stroud at (314) 646-4616; Fax (314) 646-5531; email at [stroud@stlzoo.org](mailto:stroud@stlzoo.org)

**October 14-15, 2010 - Passerine Workshop** Hosted by Zoo Atlanta, Atlanta, GA. The intent of this workshop is to increase knowledge for keepers/newer managers on basic husbandry, breeding, and daily management of various passerine species and sharing of information between institutions.

Please contact Sprina Liu, [slu@zoatlanta.org](mailto:slu@zoatlanta.org), for more information.

**October 14-20, 2010 - 30th Annual AZVT Conference.** The Association of Zoo Veterinary Technicians will meet at the Los Angeles Zoo in Los Angeles, CA. If you would like more information please visit [www.azvt.org](http://www.azvt.org) or contact Peter Flowers @ [zootekkie@gmail.com](mailto:zootekkie@gmail.com) or call (323) 644-6051.

**October 17-21, 2010 - 65th Annual Conference of WAZA.** To be held in Cologne, Germany. See <http://www.waza.org/en/site/home> for further information.

**March 2-4, 2011 - Association of Professional Wildlife Educators.** To be held at the Frank Buck Zoo, Gainesville, Texas. Watch <http://www.apwe.org/> for details as they become available.

**May 15th-18th, 2011 - 2011 Rhino Keeper Workshop.** To be held at Fossil Rim Wildlife Center, Glen Rose, Texas. For further info contact: [adam.felts@columbuszoo.org](mailto:adam.felts@columbuszoo.org)

## Upcoming AAZK National Conferences

2010 - Philadelphia, PA - August 22-26  
[www.philadelphiaaazk.org](http://www.philadelphiaaazk.org)

2011 - San Diego, CA - August 24-28

2012 - Syracuse, NY - September 23-27

For information on upcoming AAZK conferences, watch the AAZK website at [www.aazk.org](http://www.aazk.org)



## AAZK Announces New Members

### New Professional Members

Adam Cheek, **Capron Park Zoo (MA)**; Ashley R. Landry, **Reston Zoo (VA)**; Yaira Osborne, **Jacksonville Zoo (FL)**; Sharon Branch, **Sea World (FL)**; Erich Perry, **Hattiesburg Zoo (MS)**; Alex Tasa, **Minnesota Zoo (MN)**; Amy D. Newman, **Dallas Zoo (TX)**; Karly Bishop, **Moody Gardens (TX)**; Patrick Gjorven, **Pueblo Zoo (CO)**; Kattie Stong, **Santa Ana Zoo (CA)**; Heather Olson, **Oregon Coast Aquarium (OR)**. We do not publish the names of new and/or renewing members who do not list their facility on their membership application/renewal (There were five for July).

### New Institutional Members

Peoria Zoo, Peoria, IL  
Yvonne Strode, Director

### Renewing Institutional Members

Philadelphia Zoo, Philadelphia, PA  
Beth Bahner, Animal Collections Manager

Catoctin Wildlife Preserve & Zoo  
Thurmont, MD  
Richard Hahn, Director

Phoenix Zoo, Phoenix, AZ  
Bert Castro, Director

Arizona-Sonora Desert Museum  
Tucson, AZ  
Robert J. Edison, Executive Director

Hillcrest Park Zoo, Clovis, NM  
Herschel Arnold, Director

Micke Grove Zoo, Lodi, CA  
Ken Nieland, Director

America's Taching Zoo at Moorpark College  
Moorpark, CA  
Lori Bennett, Dean

## IMPORTANT NOTICE

for all Members with PayPal Accounts

All AAZK members who use a PayPal account for renewing memberships or making purchases on the AAZK website are please asked to make sure that the address in their PayPal profile is their current mailing address. If this address is not current, your monthly *Animal Keepers' Forum*, your membership card, or any merchandise purchases you make on the website will be sent to an incorrect address and will not be forwarded to a newer address. Please take a moment and double check your PayPal profile to make sure it displays your current mailing address.

### Internet Searching for a Cause

What if AAZK earned a penny every time you searched the Internet? Or how about if a percentage of every purchase you made online went to support our cause? Well, now you can! GoodSearch.com is a Yahoo-powered search engine that donates half of its advertising revenue, about a penny per search, to the charities its users designate. Use it just as you would any search engine, get quality search results from Yahoo, and watch the donations add up! Each search generates a penny for AAZK - and that can add up quickly! Here is an example of how much AAZK can earn: 100 supporters each search 4x a day = \$1460/year; 500 supporters each search 4x a day = \$7300/year; and 1000 supporters each search 4x a day = \$14,600/year

So get in the habit of searching using GoodSearch.com and support AAZK, Inc.!



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# Conference 2010

Philadelphia, PA

August 22-26, 2010



The Greater Philadelphia Chapter of AAZK is proud to be hosting the 2010 National Conference to be held August 22-26, 2010! Please visit our website [www.philadelphiaazk.org](http://www.philadelphiaazk.org) and click on "2010 National Conference" to register for this year's conference. Don't forget - after June 22, 2010, there will be a \$50 late fee applied to all full-week registrations.

Conference delegates will be staying at the beautiful Westin in Philadelphia. The conference room rate is \$189 per night. The hotel has a limited number of double rooms available; if you need two double beds in your room, please book early and let the hotel know you'd like a double room. All other rooms have a single king-sized bed. More information about the hotel is available on our website.

This year's conference will kick off with our Icebreaker to be held at The College of Physicians' Mutter Museum. Attendees will have the chance to explore the museum of medical oddities, observe the many skulls, preserved specimens, and wax models while enjoying food and drinks. Check out the venue at [www.collphyphil.org](http://www.collphyphil.org).

We are excited to announce that our keynote speaker will be Dr. Jonathan Reyman from the Feather Distribution Project. Since its creation in 1982, the project has distributed more than 8,500,000 parrot and turkey feathers free of charge to all of the Pueblos in the southwest. The Philadelphia Zoo has been a project participant for several years. This project is an easy, free way for zoos and visitors to get involved in parrot conservation. For more information on the project, please visit [www.wingwise.com](http://www.wingwise.com).

Be sure to join us for our pre-conference trip to the Bronx Zoo in New York City, and our post-conference trip to the Cape May County Zoo and a whale and dolphin watching tour! For our trip to the Bronx, we will leave from the hotel at 7:00 a.m. on August 22nd and will return in time for the Icebreaker. Price is \$40 and includes transportation and admission to the zoo. For the Cape May trip we will leave from the hotel at 7:00 a.m. on August 27th, spend a few hours at the zoo, eat lunch in the park, then go on a three-hour whale and dolphin boat tour. The bus will arrive back to the hotel at approximately 7:00 p.m. Price is \$40 and includes transportation, admission to the zoo, lunch, and a ticket for the whale and dolphin watching trip.

Please see our website for any other questions or information you might need! We are looking forward to seeing you all in August!!

[www.philadelphiaazk.org](http://www.philadelphiaazk.org)



# “The ICZ: Ten Years and Growing Strong”

*By Norah Farnham, ICZ Steering Committee Member*



## Connecting Keepers Worldwide

By now most AAZK members are familiar with the International Congress of Zookeepers (ICZ). Many of you have attended at least one ICZ conference: 2003 in The Netherlands, 2006 in Australia, or last year in Seattle. Whether or not you've attended a previous ICZ conference, mark your calendars for the next big event--- September 2012 in Singapore! Exact dates of the conference will be announced within the next 12 months.

Those of you who attended the joint AAZK/ICZ Conference in Seattle last September personally experienced the global network of keepers developing through the efforts of the ICZ. The success of this first-ever joint conference is just one result of the hard work and planning that have occupied the ICZ in its first 10 years.

Much has been accomplished in the last decade, and the next promises to be equally productive and successful. This article is meant to give some background, current happenings, and future goals of the ICZ.

## In the Beginning

A small travel grant brought representatives from seven of the world's professional zookeeper organizations to the AAZK conference in Columbus, Ohio, in 2000. Since this auspicious meeting, the ICZ has grown to an incorporated 501(c)(3) organization, complete with a Constitution, Bylaws and 6000 members worldwide!

Though the early years were occupied with necessary tasks such as formation of a Steering Committee (SC), development of a Constitution, and incorporation, we also managed to host three conferences and assist with the development of two new professional keeper associations, (ZAP and AKAA).

The SC of the ICZ consists of 18 members representing the world's nine professional keeper associations.

- American Association of Zoo Keepers (AAZK)
- Association of British Wild Animal Keepers (ABWAK)
- Australasian Society of Zoo Keeping (ASZK)
- Asociación Ibérica de Cuidadores de Animales Salvajes (AICAS) [Spain/Portugal]
- Association Francophone des Soigneurs Animaliers (ASFA) [France]
- Berufsverband der Zootierpfleger (BdZ) [Germany]
- Foundation Harpij (De Harpij) [The Netherlands/Belgium]
- Animal Keepers' Association of Africa (AKAA)
- Zookeepers' Association of the Philippines (ZAP)

The representatives have met each year, since 2000, to coordinate the development of an international association that will promote professional animal care throughout the world.

## Gaining Recognition

The emergent ICZ soon caught the attention of Gordon Reid, Director General of Chester Zoo, and, at the time, President of WAZA, the World Association of Zoos and Aquariums. Professor Reid realized the tremendous potential of this force of thousands of zookeepers. By working through its membership, the ICZ is uniquely placed to:

- Be the voice of the worldwide community of zookeepers and other animal care professionals;

- Improve the profession of zookeeping through the establishment of best practice and the standardization of zookeeping skills;
- Improve animal welfare through advanced animal care in the world's zoological institutions;
- Provide a global platform for zookeepers and a network of information sharing for the benefit of wildlife;
- Assist in the development of new and emerging regional zookeeper associations and assist zoos needing improvement;
- Mobilize the skills and knowledge required to secure wildlife populations, especially for critically endangered species;
- Develop partnerships with other organizations to improve the future for wildlife; and
- Promote conservation through zookeepers serving as frontline educators.

Worldwide, zoos and aquariums attract millions of visitors each year. As frontline educators in many of these institutions, and through their daily activities, zookeepers are well placed to inspire and mobilize these visitors to take actions in addressing conservation issues. The zookeeper's direct role in providing the highest standards of animal care and welfare, naturalistic exhibits, and conservation messages connects people with wildlife, promotes awareness and encourages action that contributes to the preservation of wildlife. By working together, the global zookeeper community and its partners can have a cumulative conservation impact in the preservation of wildlife species and their habitats.



ICZ Steering Committee with Dr. Onnie Byers,  
Singapore 2010

Initially, Professor Reid supported the ICZ by subsidizing an annual membership to WAZA, and was instrumental in giving recognition to and establishing credibility for the ICZ. His mentoring has proved to be a turning point in the growth of the ICZ.

At the Seattle Conference, the Steering Committee organized a Strategic Planning session. Professor Reid attended, and suggested that the ICZ could benefit through the assistance of a professional Strategic Planner. His recommendation was to engage the services of Dr. Onnie

Byers, Executive Director of the CBSG (Conservation Breeding Specialist Group). In February of this year, the ICZ Steering Committee held its annual meeting in Singapore. In addition to logistical planning for the 2012 conference, several days were devoted to developing our Strategic Plan, and our Vision to 2016. Dr. Byers served as facilitator.

One of the first steps in formulating a Strategic Plan was affirmation of our Mission Statement: *'The ICZ will build a worldwide network among zookeepers and other professionals in the field of wildlife care and conservation. This exchange of experience and knowledge will improve the professionalism of zookeepers for the benefit of the animals under their care and promote awareness and actions that will contribute to the preservation of wildlife everywhere.'*

This seemed to lead naturally to the ICZ Vision:

*'A global network of zookeepers with the highest standards of professional animal care contributing to a diverse and sustainable natural world where neither wild animals nor their habitats are in danger.'*



With these in mind, over the next five days the SC formulated a Strategic Plan towards 2016. The team visualized how the ICZ can reach its goals through eight Strategic Directions:

- Achieve the highest standards of zookeeping globally.
- To assist zoos in need of improvement.
- Securing the financial growth and stability needed to implement the ICZ's strategy.
- Increasing ICZ's visibility and impact.
- Improving and developing the ICZ, reflecting the needs of zookeepers, zookeeper associations and zoos needing improvement.
- Developing and delivering ICZ's core conservation activities.
- Developing and strengthening ICZ's external partnerships.
- Procure and develop a professional administrative management.

The ICZ and its 6000 members represent a wealth of experience and knowledge in professional animal care. This Strategic Plan will direct our organizational objectives of improving professional animal care, animal welfare, and increasing the professionalism and global network of the world's zoo keepers, while reaffirming our commitment to the conservation of wildlife and their habitats. This Strategic Plan shall be considered a working document, regularly reviewed and amended by future Steering Committees of the ICZ.



ICZ President Shane Good working with representatives from France, The Netherlands, England, Phillipines, and Spain on the ICZ's Strategic Plan

### **Looking to the Future**

Immediately following development of the Strategic Plan, Shane Good, President of ICZ and AAZK, traveled to Sri Lanka for the annual WAZA council meeting. The goal was to present our plan to the council, and offer proposals for future collaboration with WAZA. The meeting went very well, and the council were very receptive. As a result of the meeting, WAZA plans

to feature ICZ in their fall newsletter, and also invited us to do a presentation at their conference in October in Cologne, Germany.

WAZA is also interested in partnering with ICZ on a Crisis Management initiative, something along the lines of "Zookeepers Without Borders". Though in its early stages, the hope is to create a task force that will be able to assist zoos and wildlife in times of natural or man-made disasters. Plans for a Crisis Management meeting next year are currently being discussed.

Also proposed in Sri Lanka was the possibility of a keeper outreach workshop in that country next year. This event would be coordinated with Sally Walker and her team, Zoo Outreach Organization (ZOO)

And of course, we will continue to host a conference at least every three years. Following Singapore in 2012, we have received interest from Uganda Wildlife Education Center (UWEC) and Leipzig Zoo, Germany to host us in 2015.

For more information on any of these topics, or to view the full text of the Strategic Plan, please visit us at [www.iczoo.org](http://www.iczoo.org)

If you are interested in getting involved with the ICZ on any of our upcoming ventures, please stay tuned. As we grow and develop our plan there will be many opportunities to get active and see the ICZ make a difference in the next decade and beyond!

#### **Thanks and Acknowledgements**

Our thanks go to the entire Steering Committee who worked tirelessly on the Strategic Plan. Special thanks go to Onnie Byers for her professionalism in helping the ICZ achieve a final document. Finally, thanks go to all the zookeeper associations and institutions that supported the participants to attend, with particular thanks to Chester Zoo that funded much of the meeting and to Wildlife Reserves Singapore that provided us with facilities and additional resources.

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## **Website SALE!!!**

**Be sure and check out the AAZK website every month for special sale prices on AAZK logo products, publications, clothing items and more.**

**A new sale every month!**

**See:**

**[www.aazk.org/shop](http://www.aazk.org/shop)**

**for special sale items each month throughout the remainder of 2010.**

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# CONSERVATION STATION



## *Acting Locally*

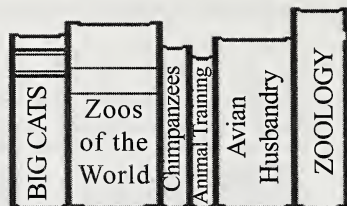
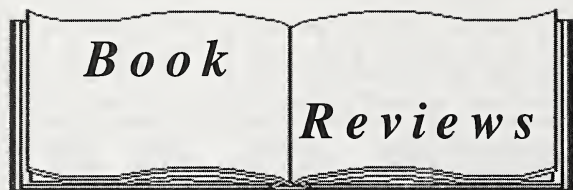
*By T'Noya Thompson Gonzales  
AAZK Conservation Committee Member  
Biologist II, Moody Gardens, Galveston, TX*

For the past three years, Moody Gardens has offered the opportunity for curatorial staff to attend an Oiled Wildlife Response Workshop. This year was the first year that my schedule allowed me to attend. I was beyond excited. Recently I have had a very strong desire to take a more active role with conservation in the community. We all do what we can to live a green life at home and at work, but it isn't often that we are privileged to physically lend our aide to conservation efforts worldwide. I commend and admire those who are in the forefront of these conservation battles, and who can educate the public and raise funds from where they reside. For me, the opportunity to get hands-on in the community was one that I could not pass up. Through the workshop I also learned about the Wildlife Rehab and Education Center and now plan to become a volunteer.

On May 20th, two co-workers and I traveled to the Wildlife Rehab and Education Center in Houston, Texas. The purpose of this workshop was to "certify and train personnel who are interested in assisting the WR&E Oiled Wildlife Response Team during a spill." With the current spill in the Gulf presenting major concern, the importance of this class was clear to the attendees. The first half of the workshop included review of wildlife laws, roles of various agencies, effects on animals and humans, zoonoses, capture, restraint and rehabilitation. The information was interesting, detailed and informative. The speakers were experienced, passionate and clear.

The second half of the workshop consisted of various hands-on activities. After a demonstration, we donned our personal protective gear and practiced capture and restraint with a few willing ducks. We observed a triage demo, a few gavage feedings and also had the option of assisting a gavage feeding under the watchful eye of a veterinarian. From there we moved outside to various washing stations. Learning how to agitate the Dawn® in the water to clean the ducks was no easy task, especially in the hot Houston climate. We split up into teams of three and worked together using all of the techniques we learned earlier in the day. My group's duck was thrilled to get a cool bubbly bath and by the time it was done, so were we! Though the ducks were not oiled, the cleaning process was very humbling. Once we completed our task, we were taken on a tour of the facility and the response team vehicles. As we wrapped up the day, certificate of completion in hand, I felt accomplished, but soon after a bittersweet feeling set in. Although it is great to be trained to aide in oiled wildlife response, it's a skill one hopes to never use.

With the current spill in the Gulf, this workshop could not have come at a better time. Even with workshop and training completed, there are online tests that have to be passed in order to actively volunteer; a small price for a big responsibility. The workshop was free and easy to register for. This is a great example of how easy it is to get involved with conservation at a local level. There is so much to do, everywhere. The information is out there. As we continue to educate, live green and raise money, don't forget your community. Get hands-on because every little bit helps in a big way!



### **Bats in Captivity. Volume 2: Aspect of Rehabilitation**

Edited by Susan M. Barnard

2010 - Logos Press, Washington, DC

ISBN: 978-1-934899-05-2 (softcover)

ISBN: 978-1-934899-04-5 (hardcover)

468pgs. Price: \$65

*Review by Liz Harmon, General Curator  
Kansas City Zoo, Kansas City, MO*

*Bats in Captivity, Aspects of Rehabilitation* is an excellent book for anyone interested in the rehabilitation and hand-rearing of native or captive bats. It covers a wide range of topics from the basics of identifying the species in your care to the handling, housing and rearing of these bats.

The book starts with the identification of bat species and then discusses the different life histories of various common species. Reproductive patterns, parental care, social organization, communication, diet and their preferred habitats are all discussed. *Bats in Captivity* also describes how to sex and age bats and the longevity of various bat species. The book then talks about various methods of capturing and handling bats of various sizes and species.

The next section deals with the rehabilitation of wild bats and discusses transporting and temporary holding, training bats to self-feed, how to identify if bats are feeding on their own and releasing bats back into the wild. These are critical steps for anyone interested in rehabilitation to understand.

The following section of the book deals with identifying individual bats and various methods that have been used successfully to mark bats. I found this to be informative for use in zoo captive collections as well as in rehabilitation situations.

*Bats in Captivity* contains a section on torpor and hibernation in bats. This is an extremely important aspect to understand when rehabilitating native North American bats.

The final section of the book deals with the hand-rearing of infant bats. There is great detail in relation to the various types of bats. There are a number of formulas that are given as well as growth charts, feeding amounts and other pertinent information for the successful rearing of bats.

I would recommend this book to anyone who has an interest in rehabilitating native bats or caring for bats in captivity.

### **Encounters with Florida's Endangered Wildlife**

By Doug Alderson

2010- University Press of Florida

ISBN: 978-0-8130-3476-8

Hardcover 192pgs. with 50 B&W photos \$24.95

Eastern bison roamed Florida into the 1800s. Red wolves disappeared in the 1920s. The dusky seaside sparrow was declared extinct in 1990.

It's too soon to say whether the 116 threatened, endangered or imperiled animal species currently found in the state will also fall victim to climate change, extermination, overdevelopment, or poisons. But as long as they remain, there will be men and women who work tirelessly on their behalf.

Combining adventure, natural history, and cultural history, *Encounters with Florida's Endangered Wildlife* features chapters on tracking panthers, black bears, whooping cranes, manatees, sea turtles,



even ivory-billed woodpeckers - which may or may not be extinct. Join the author as he travels to prairies, woods, springs and oceans to come face-to-face with these and other captivating creatures, and as he learns first-hand about their strangled lives and fragile habitat.

The book includes a chapter on the impact of non-native populations of Burmese pythons and rhesus monkeys, as well as a chilling epilogue that imagines the peninsula 100 years in the future. This scenario is based on the projections by experts in various fields, inspired by the first gathering (in 2008) of wildlife professionals and citizens who focused on Florida wildlife and climate change. Some habitats, especially those on public lands, are actually improving because of management practices such as prescribed burning and restrictions on activities such as logging. This bodes well for the many wildlife species that depend on them, and our journeys into their domain will have an added richness and mystery. By helping wildlife survive, we are ultimately helping ourselves.

Sandra Friend, author of *Exploring Florida's Botanical Wonders*, said of this book: "In relating his personal encounters with rare and endangered wildlife throughout the state, Doug Alderson captures the spirit of conservation in Florida, illuminating the efforts of top Florida conservationists who are modern-day heroes educating an increasingly detached-from-nature public."

The book is a must read for anyone who wants to know more about the current state of wild Florida.

**Special Pricing Planned for Merchandise at National Conference**

Get your shopping list ready! At the AAZK Conference in Philadelphia special pricing will be available for all AAZK products. If you are attending the conference bring a list for all your friends, family and co-workers (think early Christmas shopping!) If you are not attending the conference give your list to someone who is. The actual conference discounted prices will be listed in the August AKF and on the AAZK website starting August 1.

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<input type="checkbox"/> Wrist Coil/Clicker Combo	<input type="checkbox"/> Lanyard/Clicker Combo	

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Short Sleeve T "Eye Movement"	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> L	<input type="checkbox"/> XL
Long Sleeve T "Eye Movement"	<input type="checkbox"/> S	<input type="checkbox"/> M	<input type="checkbox"/> L	<input type="checkbox"/> XL
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**CD's:**

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<input type="checkbox"/> Enrichment Notebook/Biological Information on Selected Mammals Combo	

# People Skills For Animal People



## Keeper Communication Skills

*By Rosalie Rust, Keeper, Saint Louis Zoo  
Saint Louis, MO*

Have you ever had a conversation with a zoo visitor that started out fine and then just took a wrong turn? Do you have a co-worker who makes changes without informing you? Do the words "I need a volunteer to give a tour or presentation" strike fear in your heart? Clearly, keepers encounter a large number of opportunities to communicate with visitors, co-workers, managers, and other zoo professionals. However, achieving effective communication can sometimes be difficult and challenging. This paper will discuss ways to help you handle a variety of professional communication opportunities.

### Informal Visitor Communication

Enriching and enhancing our visitors' experiences is an important part of a keeper's job. Although we may not deal with visitors in the formal ways that the education staff does, we have frequent informal discussions with visitors on a daily basis. As a keeper, you should try to keep in mind that you are representing your zoo at all times during these discussions. You should also keep in mind that a positive interaction with a keeper may really make a visitor's day. On the same note, a surly, incommunicative or otherwise unpleasant keeper has the power to not only ruin a visitor's day, but can shape what the visitor thinks of the zoo's overall quality. In turn, this may shape what the visitor says about the zoo to others.

Some conversations with visitors are simple and straightforward; you could almost answer these in your sleep. For instance, you will be asked multiple times a day the way to the nearest restroom, the time of the sea lion show, or the baby giraffe's age. Other questions are surprisingly difficult to answer and are sometimes even confrontational. Here is an example of a difficult conversation with a hostile visitor, with three markedly different responses.

A visitor approaches, an angry look on her face, arms crossed, "Why do you always keep these animals locked up? Do these giraffes ever get to go outside?"

A. The keeper responds to the hostility, and snaps back at the visitor, "Don't you think I know what's good for my giraffes? I'll have you know that one of them is sick right now and needs to stay inside!"

B. The keeper is in a hurry and doesn't pick up on the concern the visitor clearly has, and replies simply, "Yes, of course" as she hurries away.

C. The third keeper stops and engages the visitor, "Thank you for your concern. One member of our giraffe herd is feeling under the weather. A vet is coming up to care for her right now. She's more comfortable staying with her herd-mates. After her visit with the vet, all of the giraffes will be in their outside habitat." At this response, the visitor nods her head in understanding, and her overall attitude has changed.

While we can clearly see what is wrong with choice A, choice B is the easiest, but doesn't really deal with the visitor's underlying concern about the giraffe's well-being. Taking a little more time helps calm the visitor, as well as assuring her that we understand and appreciate her concern for our animals - a concern that we share.

One strategy that can help in these difficult situations is to have a brainstorming session with co-workers and managers in which you discuss possible responses to difficult visitor questions. It helps to know beforehand what to say in a given situation. This is especially helpful if you have an animal



with an obvious health concern that has been getting a lot of visitor attention. Of course, most visitors are not zoo professionals and don't need a long litany of the animal's veterinary care. Most of the time, letting the visitor know that the animal's condition is being cared for by the vets is enough information to offer.

If you ever feel that a visitor is unconvinced by your conversation, and still seems dissatisfied and concerned about the animal's welfare, it is time to direct them to your zoological manager or curator, or possibly even public relations staff. It is better to give a disgruntled visitor this option for discussion than have them leave with doubts about the quality of your animal care. If there is enough concern on a visitor's part, they may even contact the press, bringing your zoo negative and erroneous publicity.

Another tip for conversing with visitors is to keep it simple. You want to be clear, accurate and easily understood, so don't provide a lot of unnecessary details or jargon. Also, try to speak about things in professional terms, using positive nomenclature. Many phrases we use as keepers don't accurately reflect the modern zookeeping profession and are a throwback to several decades ago. If you hear a visitor using outdated nomenclature, don't correct them directly, but phrase your answer using more zoo-friendly terms. For example:

A visitor says, "When do the animals get locked in their cages at night?"

A keeper replies, "We offer the animals access to their stalls at 4:45 pm so they can come inside or go outside as they please as long as the weather is suitable."

### **Formal Visitor Communication**

This type of communication refers specifically to tours and presentations that you are providing visitors, typically those who are not zoo professionals. Typically, these experiences can be fun for the presenter as well as the listeners as long as you are well prepared. Although some keepers look at any public speaking opportunity as sheer torture; with practice, many keepers enjoy this aspect of their jobs.

### **Tours**

One missed opportunity in many tour situations is using visual and sensory aids. Clearly, the animals themselves are the most awesome visual aids in history, and sometimes it is good to just step back in the tour and let the animals speak for themselves. Other types of sensory aids are animal artifacts. With a little preparation, you can have a small box with animal artifacts that you can present at relevant times during the tour, so the visitors can experience what an ostrich feather feels like, the size of their egg, etc. If you can show an artifact that relates to this particular individual, that is even better. Once I was able to pass around a bit of tusk from the Babirusa that we were viewing and the visitors were very impressed.

During tours, don't forget to wear your keeper "cap". Those attending tours are usually taking part in the tour because they are genuinely interested in your animals and in how you care for them. They may want to know about feeding, cleaning, and what some of your most exciting moments as a keeper were. Telling them about your first experience at a giraffe neonatal exam would thrill them. You also have a responsibility to weave your zoo's conservation message into your tour so that people learn about the hard work your zoo is doing, and to encourage additional philanthropy on their parts.

### **Professional Presentations**

Professional presentations require a lot of preparation. Commonly, Microsoft PowerPoint® is utilized to make the presentation very polished and professional, but other presentation types may be necessary, including a speech if there is not audiovisual equipment available. Start planning your presentation by thinking about what your most important message is. Use this message as a backbone for your entire presentation. One of the best ways to liven up your presentation is to tell a series of stories and anecdotes, rather than just spewing out facts. Remember, as a keeper you have had many interesting and unique experiences that others would love to hear about. When planning a presentation for PowerPoint®, avoid too many words on your slides, a common pitfall.

The key to sounding polished is lots of practice. Practice can also help get rid of your nervousness. Presenting the speech to co-workers is great; but if you can, run your presentation by a family

member or friend who doesn't work in the zoo profession to assess whether you are being clear enough. It is easy to forget yourself and lapse into "keeper-speak". Again, keeping things simple and understandable is the key to communicating your message. Also avoid reading directly from your presentation or a note card, and don't forget to look at your audience, simple tips that can be easy to forget on presentation day.

When you look around the room on presentation day, usually everyone looks interested and is focused on your presentation. Unfortunately, sometimes you may look around the room and see blank expressions and inattention. Don't get discouraged. Try to engage your audience, even asking a question of the room to get the interest level to rise. Focus on those who do appear interested. However, I have personally had a few presentations where the audience genuinely didn't appear to pay any attention. In that case, just go through the presentation, ask if there are any questions, and be done with it. Critique your presentation afterwards for improvements, but don't be too hard on yourself. Almost everyone has been in this situation once.

### **Professional Publications**

Many keepers have some area of expertise or a series of experiences that are unique. It would be beneficial for the keeper to share these experiences and knowledge with either the scientific or zoological community, or both. One of the most useful ways of doing so is to write a paper for a relevant journal. Also, it is common to write a paper or create a poster for inclusion into a conference such as AAZK National Conference, ABMA National Conference, AZA National Conference, etc.

If you are interested in publishing, the first step in this process is to evaluate your experiences for something unique and relevant that you may share with the zoological or scientific community. Maybe you have implemented a new training program or created a new enrichment experience for your animals that would be beneficial to share. Also, sometimes it doesn't need to be something that you have done on your own, but that your unit or even your zoo has implemented that would be worthy to share. Conservation projects, research, and breeding programs are also topics which lend themselves readily to publication.

After you have discovered and brainstormed your idea, the next step is to share it with your zoological manager and/or curator. They will be able to give you the required permission to pursue your publication. If for some reason, they do not give you the green light, don't feel too discouraged. It may be that they do not consider this project the right one for you, or the timing is simply not right. Simply letting your managers know that you are interested in doing some professional writing and would consider suggestions from them can also help you unearth new topics for publication. If you are still interested, continue to look for new ideas and propose them, and you will eventually get a chance to publish an original paper. You can also offer to co-author a paper with a fellow keeper or one of your managers to gain writing experience.

Once you have your manager's approval, the next phase is to plan your publication. Starting out with a brainstorming session, jotting down ideas, and refining those ideas to an outline will help structure your overall paper or poster. Next, you will need to write an abstract, which is submitted to the journal or conference committee. Keep a close eye on deadlines; if you miss one, you will likely not be able to complete the project. Your managers would likely need to look over the abstract before it is submitted, so make sure you allow them adequate time to do so. Then, you wait for an acceptance.

Upon acceptance, the real writing begins. Keep your outline close at hand, and you may want to write your first draft quickly to keep your ideas flowing with less concern for proper spelling, punctuation, etc. Once you have gotten your ideas down, the editing process begins. First, focus on mechanics, grammar, spelling, and proper word choice. You may need to brush off an old Composition textbook from college, or have someone proofread your work for you if your writing skills are a little dusty. Also, check that the flow of the paper is appropriate. Make sure that you refer to your sources and include a bibliography at the end of the work if needed. Lastly, make sure that you have accurately adhered to the guidelines regarding formatting for the journal or conference to which you are submitting the work.

Again, share your edited draft with your zoological manager and curator. This should be your polished work, so they don't have to waste time correcting your errors and can just focus on content. If you are doing your writing on the computer, you can commonly use a tool on your word processing program to allow you and your managers to track the changes that are made to the document. Once you have implemented your managers' suggestions and double checked everything, especially proper formatting, you are ready to submit your paper or poster for publication.



## **Communicating with Managers**

The most important advice for communicating with your managers is “just do it”. Not adequately communicating with managers can cause problems in your relationship with them and in extreme cases could cause a dangerous situation to occur. Daily or multiple times daily, situations occur that your zoological manager and curator need to know about. Even if it seems like you are “bothering” them too much, ask yourself what would happen if you didn’t communicate this situation and the problem escalated? It is easier to give an update on a progressing situation than to have to explain everything in a crisis. If the number of phone calls and emails you are sending to your manager(s) seems to be high, you can try combining information on several topics before you contact them; and you can check if any co-workers have information to add to the communication before it is sent. If you think it is important to be communicated, then it probably is. If it is an urgent situation, don’t hesitate to call or contact even if you just got off the phone five minutes ago. Sometimes, these things happen.

If it isn’t urgent, before you do call or email, think it through. Try to be complete. If you’ve worked for this manager for a while, you may be able to anticipate the type of questions they might ask. If an animal is not eating its entire diet, the manager may ask for how many days? Is it eating any portion of the diet (grain but not hay, only produce, etc)? Has the animal been behaving differently? Have you noticed any differences in the hay or the grain? Are the herd mates or others getting the same diet eating as usual? Have there been any disturbances in the barn or changes to the routine? As a keeper, can you suggest a reason or a solution for the problem? If you stop to ask yourself these types of questions, you can track down all the information before you contact your managers, and give them the full story. This will probably expedite things because they won’t have to call you back to find out these details. You can use your email to describe what you think might be the best solution for the situation, describing why it is a good solution, and your manager is more likely to agree to your preferred solution if they know what it is.

When emailing your managers, it is a good idea to keep things professional. While days of texting might tempt us to speak in IM, it’s best to mind your manners, and keep spelling, grammar and punctuation in mind. Also don’t forget to sign your email, especially one from a joint account (10+ keepers utilize our antelope unit’s email address), so they can track you down properly with their response. Also, using the subject line to provide information can help. “Broken Cable at Camel Barn” is a lot more informative than “Problem” as a subject and can help your manager sort through an endless sea of email to find the appropriate one.

Sometimes all this communication can lead to overload. You may feel like you are spending so much time calling or emailing your manager that you don’t have time for anything else. Oftentimes, keepers report an overload of emails being the main problem. Start with emails from your manager. Also, if your manager sends you less urgent information that may not be necessary for your daily routine, you can ask if those emails be marked in a certain way. Our managers kindly mark these with the prefix AYL (at your leisure). Of course if your manager does not use email and spends the day close by, you may be dropping in to verbally update them. A dry-erase board can be handy to leave messages for your manager when they are not close by. Asking to have a quick morning briefing or meeting after lunch can help immensely in keeping managers informed.

## **Keeper to Keeper Communication**

Communicating well with co-workers is one of the most important things that keepers can do. Most importantly, constant quality communication is required to keep both animals and keepers safe. Also, consistent communication is necessary to achieve a high level of quality animal care. All individuals who are caring for a group of animals need to be consistent in diet, routines, medical care, and training to keep the standard of care high.

One of the simplest methods of keeper-to-keeper communication is having a dry-erase board or chalkboard that lists the details of the routine. Any changes are noted on the board immediately, such as addition of medication, changes in diet, training and enrichment protocols, etc. Then, all keepers check the board and a consistent level of care is achieved. Of course, this method only works if the board stays up-to-date. If not, it can provide outdated and incorrect information. Generally, the primary keeper keeps the board up-to-date, but the relief keeper may need to make changes occasionally when they happen on his/her watch.



Another method of communicating changes to a routine is to leave a note about the routine when any keeper leaves on their weekend. New illnesses, medications, or other concerns can be outlined. Remember that a keeper cannot know something about the routine or animals unless they are told, and one should not guess about the routine. If you are not certain about what needs to be done with any animal specifically, you should check with either the primary keeper or if you cannot reach them, the zoological manager. It is better to track down the right answer than make a guess and have it be wrong.

Keeper communication goes beyond what is detailed above. It is also essential for a harmonious work environment. When considering a course to take among various options, it is good to have a discussion with all who will be affected by the plan. Asking for your co-workers' input can help you look for problems with your plan and can keep the team working well together. One common cause for discord among members of a unit is when changes are made and no discussion occurred. Allowing for everyone to weigh in also means that all keepers will be informed of the change, and will be more likely to be supportive of it and implement it correctly.

Of course, when anything is up for discussion, you may reach an impasse where neither side is willing to budge from what they perceive is best. In these instances, outline both scenarios and all supporting evidence for both possibilities, and allow the curator or zoological manager to make the decision. This way, no hard feelings occur among keepers.

Another form of keeper communication is formal recordkeeping. Keeping records is an essential part of zookeeping. For instance, having a consistent recordkeeping system is important when looking up information from the past. A meeting with all keepers who will be entering records can ensure that information is kept in a consistent way and approved terminology is used.

#### **A Breakdown in Keeper-to-Keeper Communication**

Of all of the communication challenges, the most common ones occur when communications break down between keepers. Oftentimes, there is a misunderstanding, where the message which Keeper A meant to convey to Keeper B is somehow confused.

For instance, Keeper A says, "Did you bring the lions in already or are they still outside?"

Keeper B says, "Yes they are."

Of course, we don't know which question Keeper B answered. Ideally, Keeper A and Keeper B catch the problem before a mistake is made. Being clear when conversing with a fellow keeper, asking for clarification if needed, and making sure the conversation is free of distractions can aid in making sure the message is properly conveyed.

Individual personality types may play a role with communications. Some people are more talkative, and tend to volunteer lots of information. Others tend to be more reserved. It can be difficult for these two types to work together in harmony. On the one hand, the quieter keeper may feel bombarded, and the talkative keeper may feel that they are not getting the information that they need. Oftentimes, the quieter keeper may not volunteer information on his/her own, but will answer questions readily if asked directly. If you feel you are having a challenge communicating with a co-worker, and aren't getting information about important things that you should be getting information about, discussing the problem in a forthright but non-confrontational way may help. Tell the individual how you like working with them, but you would appreciate a little more information. Most of the time, this discussion will alleviate the problem.

If the communication breakdown continues to the point that you feel it is affecting your ability to do your job (i.e., you are not getting key information about appointments, medications, animal health, etc), it is time to involve your managers. You don't want to do this in a way that escalates the situation, but sometimes it is necessary to act before you miss something major. Also, you can request from your managers that they directly communicate with both of you, so that the other keeper doesn't feel like they constantly have to be updating you as well. Implementing either a dry-erase board or notes to increase communication between keepers can help too.



A final note when discussing keeper-to-keeper communication: keep things professional and avoid gossip. This is easier said than done. Of course it is natural to get comfortable with your co-workers and share things about your personal life. Co-workers may reciprocate as well. However, hurt feelings may arise when you mistakenly share something that a co-worker has told you in confidence with the rest of the unit. If there is a falling out between keepers, personal information may “accidentally” leak out. Some information is better to avoid at work entirely. This is a matter of common sense - just remember the training you received in any sexual harassment and diversity training courses you have attended. If these courses are not available at your place of employment and you feel that your team has a need for them, you may want to suggest them to your manager. Keepers tend to appreciate working in an environment with mature adults, not one that resembles a high school locker room.

### **Organized Communication**

With all of the different types of communication, it is easy to be overwhelmed. Organized communication is important. It ensures that the proper people have access to the proper information regarding their jobs. One thing that can help is keeping a personal pocket-sized notebook in which you can jot down things you are told or need to tell others, so you can check it off when it is done. Also, you can refer to details in your notebook in the future when you might only have a slight recollection of a past event.

Third party communication can be a particularly tricky situation. It is difficult to remember when you are appointed the task to communicate something with others from another person, especially when it doesn't relate to you directly.

For instance, a co-worker might tell you, “I don't have a chance to tell Mike that he needs to be ready for a VIP tour at Hippo Barn tomorrow at 8 am. Can you tell him for me?”

You reply, “Sure.”

Its several hours before you see Mike and by that time you've completely forgot this message. Since it is not your message and you are only peripherally involved, you are more likely to forget this message than something you personally need to tell Mike. Stopping and writing a note to Mike as soon as you get the message is a great way to avoid forgetting to pass the message on. Also, a written message can help Mike remember as well. When he does get the message, he can refer to the details later, instead of scratching his head and wondering, “What time is that tour again?”

Of course, there are many different ways to keep things organized. Personal notebooks, dry-erase boards, emails, and calendars are all tools that can help you communicate with your co-workers better. Of course as with any tool, these need to be used to be effective. Good communication can aid you and your co-workers in achieving quality animal care on a daily basis.

Remember that communication is one of many powerful tools which you possess as a keeper. Like any tool, it must be used to be effective. Contemplating the importance of communication in your daily workplace and ensuring it gets the time and attention it deserves can be the best way to make sure that your team is communicating well. Usually no one thinks too much about communication until it breaks down and problems occur. When problems do occur, use the experience to help your team hone their communication skills.

**Next Month's Topic: Conflict Resolution on the Job**



## Training Tales...



### Operant Conditioning and Wellness in American Alligators (*Alligator mississippiensis*)

By Emily Maple, Keeper II Reptiles,  
Palm Beach Zoo, West Palm Beach, FL

Fred and Wilma are a pair of 22-year-old American alligators that live in a naturalistic lagoon in the center of The Palm Beach Zoo. The lagoon is fed by a natural spring, and it is divided into two pools by a small waterfall. Historically, the animals had been noted as being overweight, sedentary, as well as aggressive to keepers when maintenance was needed in the lagoon. The alligators had previously been on a small training regimen to allow weekly Gator Talks, given by reptile staff members. It was decided that the animals would benefit from an overall wellness program including new training plans as well as diet changes.

The idea of developing a wellness plan for our alligators was a novel one. Wellness is defined as “1. the quality or state of being healthy in body and mind, esp. as the result of deliberate effort.” (Dictionary.com, 2010). In studies done on American alligators, response to exercise was “... similar to mammals. Alligators respond to exercise training by increasing their heart size and oxygen carrying-capacity of the blood” (O’Leary, 2006). To begin the wellness program, we knew the diets of our animals were going to be changed, but we also realized the amounts and frequencies



The author keeping the alligators  
by the visitor glass

of feedings would need to be adjusted as well. Based on ideas from crocodilian managers at other zoos, we decreased the amount of rodents and poultry and frozen fish being offered, and began feeding the supplemental Crocodilian Diet (biscuits) from Mazuri®. We fed only biscuits during daily station training, and fed smaller amounts of whole animals during the weekly keeper talks.

Reptiles’ intellectual capabilities are being discovered as the years pass; “contrary to the widely accepted ‘reptile brain’ theory of intelligence, the alligator is intelligent” (Eme, Okerkiewicz, Gwalthney, Blank,

Rourke, and Hicks, 2009). Therefore we can conclude that they should be easy to train. The goal of previous training for Fred and Wilma was to station (position themselves at a specific location), and to lift their bodies out of the water to feed off of tongs during keeper talks. We derived our new training techniques such as shaping, as described by Karen Pryor, to teach the alligators “one step at a time, toward an ultimate goal” (Pryor, 1984). Previously, Fred and Wilma’s cue was the sound of a bucket banging on the visitor deck. For the new training, the keepers instead used verbal cues, so that the animal could be called from different areas in the enclosure to one of several specified stations.



The goal of the new training was to shift the animals to one of the new stations, and eventually get them to walk over the waterfall and stay with the keeper during exhibit maintenance, keeper talks, or even during the annual egg collection. After a few weeks of daily training sessions using crocodile biscuits as rewards, Fred and Wilma would successfully walk up and down the waterfall, and would walk over dry land to one of four different stations.

The first real test of our training came during our seasonal papyrus trimming event, where staff members enter the enclosure and use nine-foot PVC push poles to hold back the alligators. The training was a success in that neither alligator hissed or approached the keepers in the enclosure, but instead stayed in the deep water station by the viewing area with



Fred walking over dry land to the top station. Author is holding bucket.

the keeper who had biscuit rewards. The trimming usually takes 20 minutes or longer, and the alligators never lost interest in the positive reinforcement. This was a great relief to our horticulture team who always dreaded entering the water with a thirteen-foot-long Fred and eight-foot-long Wilma.

Some of the benefits of training the alligators were: improved safety of staff members (keepers and horticulturists); the ability to perform husbandry and maintenance tasks more quickly; reduction of stress for the animals during these tasks; increased trust and bonds between animals and keepers. The alligators were quick to learn new behaviors, and retained the behaviors over the winter when they became less motivated by food rewards. Additional benefits of the wellness training were increased enjoyment and learning for guests and improved overall health and appearance of the animals. Guests, especially school children, were very excited to learn about our wellness programs for our animals. They had many questions, so the daily training session also became a popular keeper interaction for the public and even for the zoo docents and volunteers.

As a result of the wellness training, the keepers have noticed that Fred and Wilma have lost some of their excess fat. Consequently, the alligators have increased their ability to capture wild birds and fish in their enclosure, something that all healthy wild alligators do.

### **Acknowledgements**

I wish to thank Dr. Terry Maple for his idea to create wellness projects for animals here at The Palm Beach Zoo, Mr. Keith Lovett and Mr. Mark Halvorsen for allowing, assisting and overseeing my training and wellness projects.



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**AAZK Behavioral Husbandry Committee Comments** (by Angela Binney, Training Tales Column Editor): This Training Tale is a great example of how training techniques can be applied in all areas of the zoo. Historically, behavioral husbandry programs have focused on more furry lots; however, we are now seeing more and more cases of successful operant conditioning programs being implemented with reptiles and amphibians. This new trend is really making a positive impact in our industry, providing safer options for animal husbandry and exhibit maintenance for our ectothermic charges and their keepers!

*Editor's Note:* Emily presented this project on May 23, 2010 at the AZA Croc School held at the St. Augustine Alligator Farm, St. Augustine, Florida.

## Zoo Saves Research Monkeys from Euthanasia

Twenty Squirrel Monkeys (*Saimiri sciureus*) that spent years undergoing behavioral testing at Stanford University are about to learn what normal monkey life is at the San Francisco Zoo. The monkeys are among a group of 59 that needed homes after Stanford lost grant money and asked the Association of Zoos and Aquariums [AZA] to help find them homes.

Now, the three to five-pound monkeys are nearing the end of their mandatory quarantine at the San Francisco Zoo before they can join the other animals at that facility.

"They were in a research facility where they do not allow anything that can't be sterilized and didn't have any natural elements," said Primates Curator Corinne MacDonald. "We're slowly introducing them to natural things. They're loving it."

The entire group of 59 Squirrel monkeys has been spread out among at least six other zoos.

"Part of it is capacity. We want to make sure we have appropriate habitats and natural social groupings," AZA spokesman Steve Feldman said. Feldman said it took more than a year to coordinate the placements.

San Francisco Zoo officials and the AZA would not disclose details about the monkeys' testing or their living situation at the campus, and college officials declined to comment. However, zoo officials did say it was a matter of life or death for the monkeys, which are most commonly found in the Amazon Basin. They were scheduled to be euthanized when the research facility lost its funding.

When MacDonald feels they are ready to revel in trees and dirt, the monkeys will temporarily live in the Primate Discovery Center. In the meantime, the zoo will use a \$250,000 donation specifically for the monkeys to extend an outdoor exhibit at the new South American Tropical Rainforest Aviary that's still under construction. *Source: SF Examiner.com, Kamala Kelkar, San Francisco Examiner Staff Writer, June 3, 2010*



# *All Wet! An Innovative Water Sprayer System for Hippo Enrichment*

By

*Jennifer J. Elston, Ph.D., Curator of Conservation and Behavior  
Fort Worth Zoo, Fort Worth, Texas*

## **Introduction**

Environmental enrichment enhances animal welfare and aids in effective behavioral management of animals in captivity, and encompasses those provisions (e.g., space, social interaction, foods, objects, scents, etc.) that stimulate natural behavior and offer choices for animals (Young, 2003). Enrichment can be used to encourage activity and thus plays a role in promoting the psychological and physical health of animals in zoos (Forthman, 1993; Cummings et al., 2007; Skibieli et al., 2007). An important aspect of enrichment is novelty. The presentation of novel objects to chimpanzees (*Pan troglodytes*) increased object manipulation behaviors and reduced inactivity, but chimp interest in those same objects decreased over time (Paquette and Prescott, 1988). However, when enrichment is highly stimulating it can have long-lasting effects; chimps interacted with a puzzle feeder throughout a 10-week study period and continued to be engaged by the feeder months after the study was complete (Brent and Eichberg, 1991). Additionally, an African leopard (*Panthera pardus*) continued to respond to acoustic enrichment in the form of bird sounds for over 16 months (Markowitz et al., 1995).

Hippopotamuses (*Hippopotamus amphibius*) are typically nocturnal animals that naturally rest in water during the day. They are popular animals in zoos and are housed in 118 institutions worldwide (ISIS, 2009); however, they are generally inactive during the day when zoo visitors are present. In zoos, encouraging hippo activity during the day can be challenging, and effective techniques for enriching hippos are limited in the literature. Shepherdson et al. (1998) offer suggestions for hippo enrichment, however, reports of hippo use of enrichment initiatives are absent from published literature.

The objectives of this study were three-fold: 1) increase activity during the day and effectively enrich two hippos housed at the Fort Worth Zoo, 2) develop an enrichment initiative for hippos that would continue to stimulate activity over the long-term, and 3) create a positive visitor experience at the hippo exhibit.

## **Methods**

Two 25-year-old female hippos were housed at the Fort Worth Zoo in Fort Worth, Texas. The hippos had access to a pool (approximately 15m in diameter and 1.5m deep) while on exhibit for seven to eight hours every day. The majority of their time was spent in the pool during the day and they were shifted off-exhibit into a barn at night. The hippos were fed twice daily, with random food enrichment (e.g., apples, carrots, watermelon, etc.) presented to them in their pool while on exhibit.

In August 2008, a system was installed to spray two fast-running streams of water into the hippos' exhibit pool. The system consisted of an irrigation controller (Hunter® Pro-C) that was connected to a water line with two PVC pipes (1-inch diameter) attached, each fixed with a nozzle that pointed toward the pool. The system operated on a timer that was programmed to run for five minutes at 11:45, 13:15, 14:45 and 15:30 hours. Scan sampling (Martin and Bateson, 1993) was used to record the hippos' behavior (Table 1) at random times between 10:00 and 16:30 hours seven months before (409 scans) and seven months after (409 scans) installation of the system. Data were collected by three researchers with an inter-observer reliability of 100%.



**Table 1.** Ethogram used to document behavior of hippos (n = 2) before and after a water sprayer system was installed in their exhibit at the Fort Worth Zoo in Fort Worth, Texas.

Behavior	Description
Stationary	Motionless
Active	Performing movement (e.g., swimming, walking, lifting body from water, etc.)
Interacting with streams <sup>1</sup>	All/any part of the hippo's body is in contact with water squirting from the sprayers

<sup>1</sup>After installation of water sprayer system in August 2008

### Results

Before installation of the system, both hippos were stationary 54% of the time. Stationary behavior was reduced to 46% of the time after installation, demonstrating an 8% increase in activity. Both hippos expressed appropriate, natural behaviors toward the water streams (e.g., approached, swam through, opened their mouths to drink water; Figures 1 and 2). When the system was running, both hippos interacted with the water streams 45% of the time and at least one hippo interacted with the streams 60% of the time. However, both hippos were less active in the morning than afternoon. Because of this natural behavioral pattern, the hippos seldom interacted with the water streams in the morning. Based on data during the afternoon only (12:00 to 16:30 hours), both hippos interacted with the water streams 54% of the time and at least one hippo interacted with the streams 69% of the time the system was operating.

### Discussion

This study provides evidence of a successful enrichment initiative for hippos. Both hippos performed natural behaviors when the water sprayer system was operating and, additionally, increased their overall activity after the system was installed. The hippos showed a prolonged interest in the water sprayers by regularly interacting with the streams even seven months after installation of the system. In fact, at the time of this writing, 15 months after installation of the sprayer system, casual observation has revealed that the hippos continue to actively use the streams. The variable timing of the activation of the water sprayers may have contributed to the attractiveness of this enrichment over an extended period: the sprayers were activated four times per day rather than running continuously and the length of time they were running was limited in duration (five minutes). This extended the novelty of the water sprayers and reduced the likelihood of the hippos losing interest in the streams over time.

Visitors reacted favorably when watching the hippos interacting with the streams by smiling, laughing, engaging in conversation, calling others to the exhibit and taking photos and video. Examples of visitor comments include: "Hurry, he's taking a drink, watch!", "The hippos are taking a shower!", "This is the most action we've seen from them!". These, and additional positive comments from visitors upon viewing hippo interaction with the streams, indicated an enhanced visitor experience.

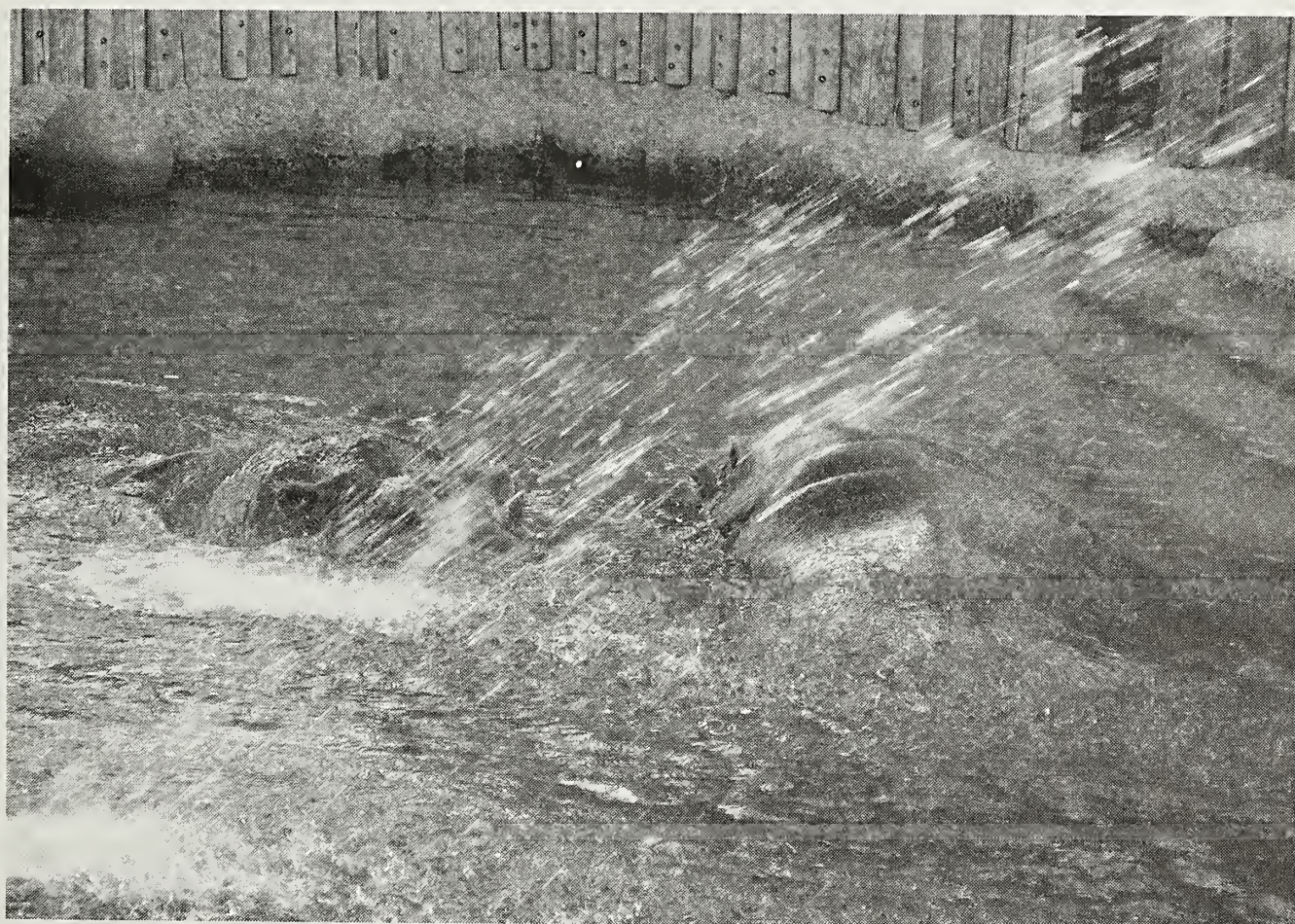
### Conclusions

The addition of a water sprayer system effectively enriched two hippos, as evidenced by an increase in activity and the display of species-appropriate behaviors. Prolonged use of the water sprayers by the hippos indicated that this enrichment initiative was successful over the long-term. Enrichment that provides animals with opportunities to display their species-specific and desired behaviors benefits zoo visitors in terms of both education and enjoyment because of the increased likelihood of observing animals performing natural behaviors.





**Fig. 1.** Hippo expressing natural behavior while interacting with an automated water sprayer system at the Fort Worth Zoo in Fort Worth, Texas. (Photo: J. Elston)



**Fig. 2.** Two hippos interacting appropriately with an automated water sprayer system at the Fort Worth Zoo in Fort Worth, Texas. (Photo: J. Elston)



## Acknowledgements

Thanks to Becky Volk, Assistant Curator of Animal Training and Enrichment, and Laura Wise, Animal Programs Coordinator, for assistance with data collection. Thanks are also extended to Fowlkes, Norman and Associates, Inc. for installation of the water sprayer system, the Fort Worth Zoo's Engineering Department for maintenance of the system, and the Fort Worth Zoo's Elephant Department for excellent care of the hippos.

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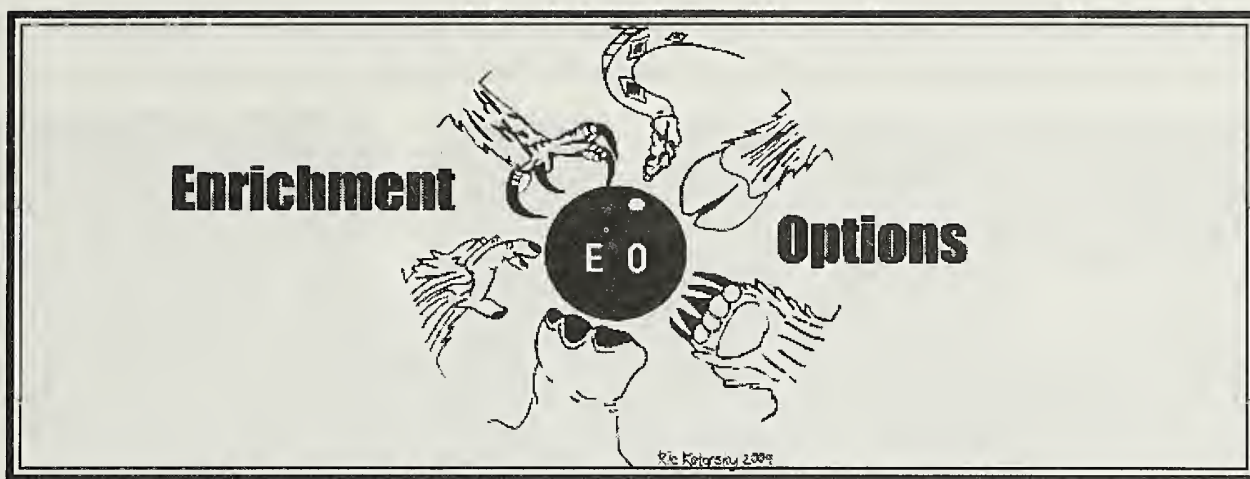
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*EO Editors -*

*Julie Hartell-DeNardo, Oakland Zoo and Ric Kotarsky, Tulsa Zoo & Living Museum*

## **Paper Projects at the Sedgwick County Zoo**

*By Micala Teetzen, Relief Keeper  
Sedgwick County Zoo, Wichita, KS*

Sedgwick County Zoo is home to a group of dedicated volunteers known as the Enrichment Crew. For the last several years we have been using large rolls of Kraft® paper to make many enrichment items. The rolls come in a variety of weights, widths and colors. We use 48" wide by 200' long and the cost is about \$30 including shipping (and they are VERY heavy!!).

The base of all of our designs is the braid. A braid is made by cutting three equal lengths of paper, crinkling them (this makes braiding easier) and then braiding the pieces together. (See Photo 1.) To determine the length of paper to cut, keep in mind that braiding divides the length approximately in half. For example, using 16' long pieces of paper results in an 8' to 9' long braid. Of course, this is also dependant on the tightness of your braid. It is easiest to have at least two or three people working on making braids—one to do the braiding, one to manage the 16' long tails and one holding the top end. If you don't have a third person, you can put something heavy on the end to hold it while you braid. The ends can be tied with rope or strips of cloth.

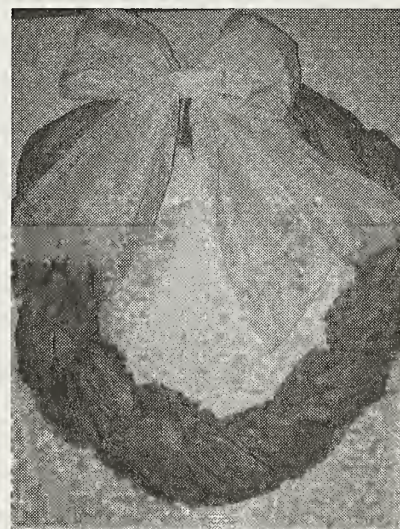


**Photo #1** (Author)

The first creations we made were wreaths. To make a wreath, simply tie together the ends of the braid to form a circle. The 16' pieces will make a wreath with a 3' diameter. A paper bow made from another color can be added, if desired. (See Photo 2.) For "Season's Treatings" (our zoo's annual holiday artificial enrichment day), we use green paper for wreaths. The rest of the year, we use a light brown color for a more naturalistic

appearance. Our chimps love to use theirs as pre-made nests. They are durable enough that they usually last for several days. For smaller animals, wreaths can be made on a smaller scale by cutting the 48" width paper into thirds and braiding the narrower strips.

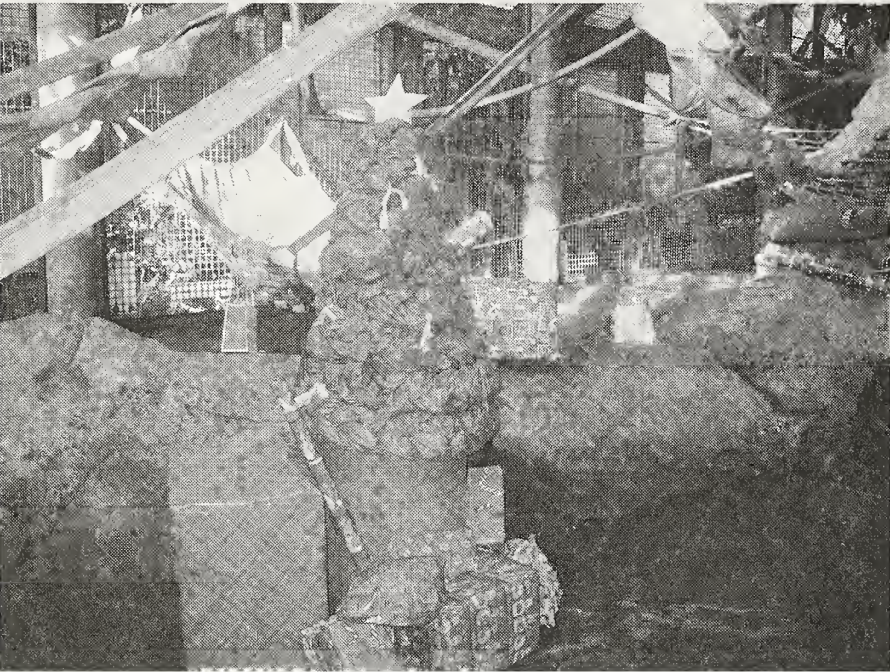
After making wreaths for a couple years, the Enrichment Crew wanted to try something new. We made green wreaths of decreasing sizes and



**Photo #2** (Author)



stacked them to make a Christmas tree. The wreaths were tied together with colored strips of fabric to represent ornaments on the tree. (See Photos 3 and 4.) Our orangutan even climbed inside!

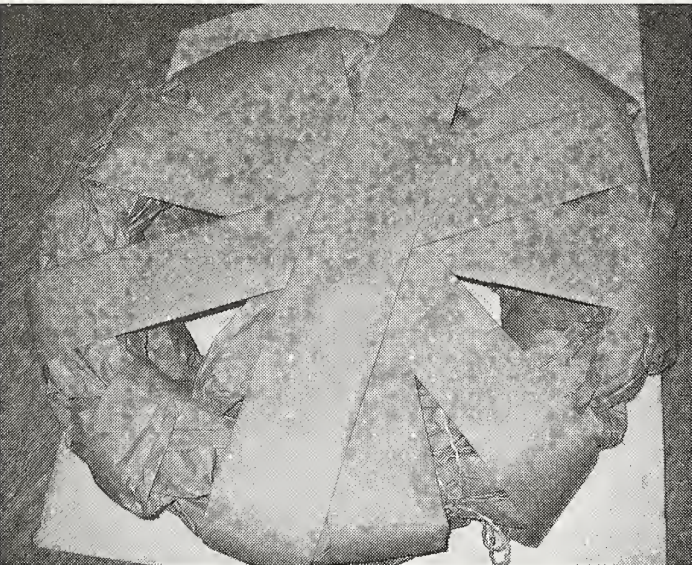


**Photo #3** (Debi Schumacher)



**Photo #4** (Danielle Decker)

Our third type of paper masterpiece was Easter baskets. Sedgwick County Zoo has an annual event, “Easter Eggstravaganza”, during which the animals get special egg-related treats. Tired of trying to find a store-bought basket that could be approved for our animals (no staples, no dyes, etc.), we decided to make our own paper baskets to hide eggs in. To make a basket, make several wreaths of the desired size and stack them. The wreaths are then either tied together with rope/fabric strips or woven together using paper strips. For a huge 3’ basket, take several 16” wide strips of paper (cut the 48” width into thirds) and fold them in thirds again to make stronger 6” wide strips. These will not be crinkled or braided, but used to weave the wreaths together while also creating a bottom for the basket. (See Photo 5.) Tuck the ends of the weaving strips into the braids to hold in place. Braid another section to make a handle. A paper bow can also be added. For Easter grass, we have used either hay or green wood wool (dyed green with food coloring). Giant plastic eggs are also a hit with the animals. (See Photo 6.) We made them into puzzle feeders by drilling small holes in them and putting raisins inside. The eggs are fairly inexpensive, but have thin walls and are thus easily smashed. They are available at craft supply stores during the Easter season. We also hide Jell-O® eggs, hardboiled eggs, etc. in the “grass.”



**Photo #5** (Author)



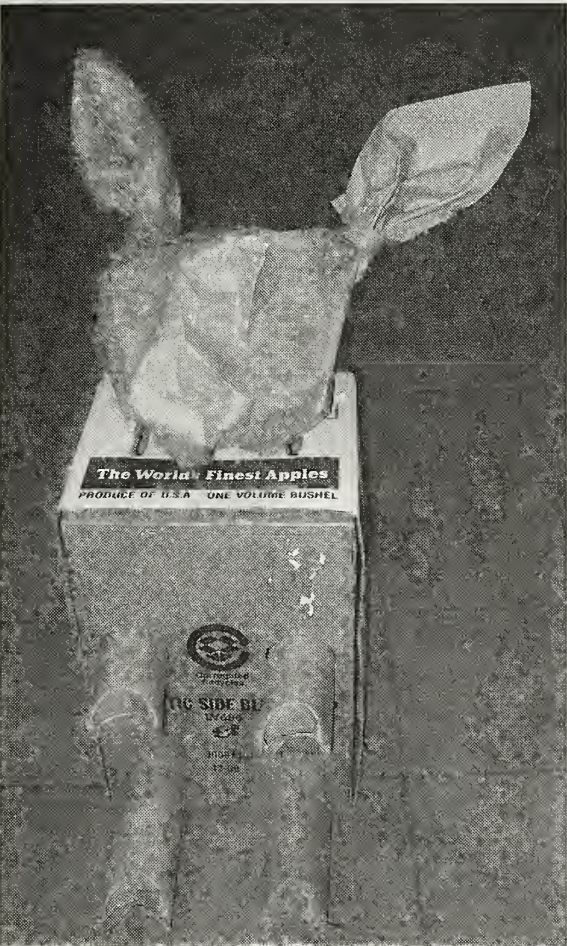
**Photo #6** (Author)

If it is not in your enrichment budget to buy multiple rolls of paper in different colors, try painting the paper to achieve desired colors. It works best to paint the paper before braiding to ensure good



coverage. On the Easter basket, two colors could be used, one color for the braids and one for weaving. Or use a rainbow of spring colors to make each strand of the braids a different hue.

This year we have added a few more Easter projects to our list. We made Easter bunnies using apple boxes for the bodies and cardboard tubes for legs. The head is made from a square of the Kraft® paper, forming the ears from two corners. The ears are tied using a strip of paper. (See Photo 7.) We also made eggs and flat Easter baskets from grain bags. We cut out the shapes and then glued the edges leaving an opening for stuffing them later. These were then painted. (See Photo 8.)

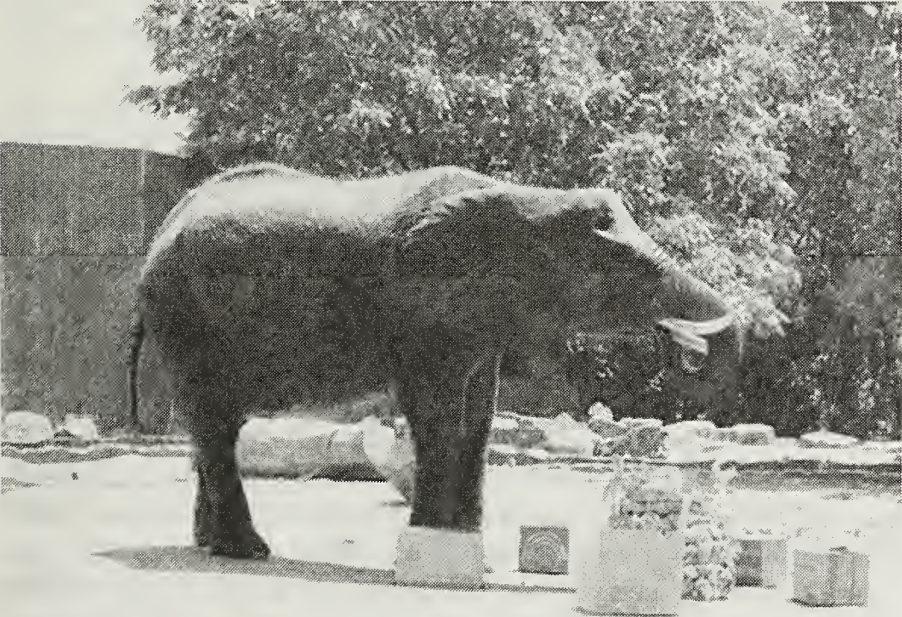


**Photo #7** (Author)



**Photo #8** (Author)

The final paper project was birthday cakes for our elephants. These tiered cakes were made in the same manner as the Christmas trees. We used wrapping paper tubes for candles, complete with construction paper flames. The cakes were decorated with origami animals and paper flowers. (See Photo 9.) We couldn't pull off any of these special enrichment events without our wonderful team of volunteers. A special thanks goes to Debi for lugging the roll of paper home as our enrichment elf for the past few years!



**Photo #9** (Sedgwick County Zoo Graphics Dept.)

*(Ideas appearing in this column have not necessarily been tested by the editors for safety considerations. Always think ahead and use good judgement when trying new ideas. You are invited to submit material for the Enrichment Options column. Look in the January 2004 issue of AKF for guidelines for articles acceptable for this column's format or contact the editor at [akfeditor@zk.kscoxmail.com](mailto:akfeditor@zk.kscoxmail.com) for a copy of the guidelines. Drawings and photos of enrichment are encouraged and may be submitted, along with article text in MS Word ONLY, as attachments to the email address above. Photos should be sent either as jpg or tifs with a minimum dpi of 200 (300 dpi preferred).*



# Conservation/Legislative Update

Column Coordinators: *Becky Richendollar, North Carolina Zoo*  
and *Greg McKinney, Philadelphia PA*

*This month's column was put together by*  
*column co-coordinator Greg McKinney*



**Arizona Man Pleads Guilty in Jaguar's Death** - A southern Arizona biologist has pleaded guilty to a misdemeanor federal charge for his role in the 2009 trapping and subsequent death of a rare jaguar (*Panthera onca*) known as "Macho B." Emil McCain, 31, of Patagonia, entered his plea to illegally "taking" an endangered species in U.S. District Court in Tucson and was immediately sentenced to five years probation. McCain was also barred from being employed or involved in any project or job involving large wild cats, according to his plea agreement. McCain worked with the Borderlands Jaguar Detection Project, which was contracted by a joint New Mexico-Arizona jaguar conservation team to study the elusive big cats. A Game and Fish employee who worked with McCain has been fired. A U.S. attorney's office spokesman said the criminal investigation was ongoing but wouldn't comment on whether others might also be charged. Another investigation into the matter by the state wildlife department was also ongoing.



**Jaguar** (Photo: USFWS)

Macho B was trapped on Feb. 18, 2009, fitted with a radio collar and released. Game and Fish initially called it an "inadvertent capture" and a potential treasure trove for scientists trying to determine if the cats lived in the U.S. or just were occasional visitors from Mexico. The jaguar was recaptured due to health problems and euthanized on March 2, 2009. It was the only known wild jaguar in the United States. It wasn't until several months later that questions began to arise about whether the jaguar had been intentionally the target of Game and Fish trappers who were looking for cougars and bears. According to the plea agreement McCain signed, he placed jaguar scat or told a woman on the trapping team to place jaguar scat at three snare sites in an attempt to capture and trap the jaguar. McCain knew a jaguar had recently been in the

remote area between Arivaca and Nogales and the Game and Fish team he was working with only had authorization to trap mountain lions and bears for research, his plea stated.

"We now know that McCain acted in a personal capacity to intentionally capture a jaguar," Arizona Game and Fish said in a statement." McCain's admission of guilt supports the Arizona Game and Fish Department's longstanding assertion that agency personnel did not set out with intention to capture a jaguar.

McCain's lawyer, Alfred Donau, said his client has already taken a job out of the country as a wildlife biologist but wouldn't disclose where. Donau told The Associated Press that while McCain was remorseful the jaguar had died, the trapping would have had much different results if the cat had lived because he was seeking scientific data for conservation purposes.

Jaguars were thought to have been eliminated in the U.S. by 1990 until two were spotted in 1996 in southern Arizona. The capture of Macho B was the first time one had been trapped in the U.S.  
*Source: Associated Press, Bob Christie, 14 May 2010*

**List of Endangered Species Growing Longer** - Far too many of the world's plants and animals - and the wild places that support them - are at risk of collapse, a U.N. report finds, despite a global goal set in 2002 for major improvement by this year. Frogs and other amphibians are most at risk of extinction, coral reefs are deteriorating most rapidly and the survival of nearly a quarter of all plant species is threatened, the U.N. Convention on Biological Diversity said in a report issued every four years. The outlook on the planet's ecological diversity and health is produced under a 1993 treaty since joined by most of the world's nations. It says the planet is falling short of its goal to achieve



by this year “a significant reduction in the current rate of biodiversity loss at the global, regional and national levels.” Pollution, climate change, drought, deforestation, illegal poaching and overfishing are among the many culprits named.

U.N. Secretary-General Ban Ki-moon warns in the report that the consequences of “this collective failure” will be severe for everyone on the planet if it is not quickly corrected. “We must give it higher priority in all areas of decision making and in all economic sectors,” he says. “Conserving biodiversity cannot be an afterthought once other objectives are addressed - it is the foundation on which many of these objectives are built.”

The U.N. had declared 2010 would be the “International Year of Biodiversity,” seeking to raise awareness. But the report provides extremely dire projections of the state of biodiversity globally, such as the loss of huge areas of the Amazon rain forest and many fresh water lakes. The report is based on a survey of some 500 peer-reviewed scientific articles and intergovernmental assessments, and was financed by Canada, the European Union, Germany, Japan, Spain and Britain, along with the U.N. Environment Program. Among the biggest problems is that species are being lost even before scientists can properly study them.

“That’s the tragedy of biodiversity loss,” said Delfin Ganapin, a senior manager for the U.N. Environment Program’s Global Environment Facility that provides financing for the treaty’s goals. “Before you’ve read the book in a library, you’ve already lost the books.”

Competition for jobs and economic growth, rather than lack of planning, is seen as the biggest hindrance, particularly in the least developed nations of South Asia and sub-Saharan Africa, where many of the world’s most impoverished people live. Africa, for example, is home to a quarter of the world’s mammal species and a fifth of all bird species. Forty-nine of the African Union’s 53 nations have strategies for saving imperiled species. But none of the 110 nations that submitted reports to the treaty claimed to have met their individual targets for improving biodiversity.

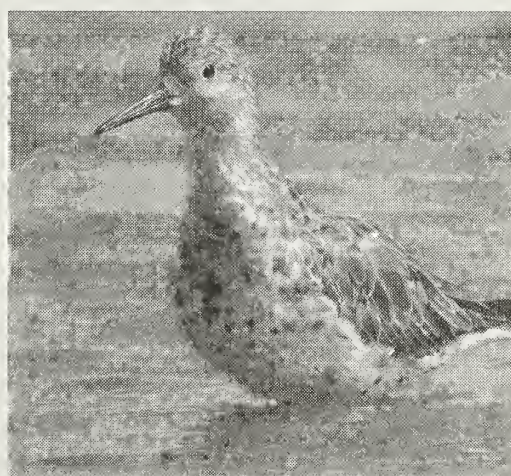
Still, many of these problems “could be solved with urgent action,” Ganapin told a news conference at U.N. headquarters. “If we can only summon even a fraction of the money that was put in to solve the financial crisis, we would have been able to avoid very much more serious and fundamental breakdowns in the Earth’s life-support ecosystems,” he said.

The report does contain a few slivers of hope: It says, for example, that measures to control the spread of so-called alien invasive species have resulted in the rescue of at least 31 bird species during the past century. *Source: Associated Press, John Heilprin, 16 May 2010*

**Wetland Aliens Cause Bird Extinction** - BirdLife International has announced, in the 2010 IUCN Red List update for birds, the extinction of Alaotra Grebe (*Tachybaptus rufolavatus*). Restricted to a tiny area of east Madagascar, this species declined rapidly after carnivorous fish were introduced to the lakes in which it lived. This, along with the use of nylon gill-nets by fisherman which caught and drowned birds, has driven this species into the abyss.

“No hope now remains for this species. It is another example of how human actions can have unforeseen consequences”, said Dr. Leon Bennun, BirdLife International’s Director of Science, Policy and Information. “Invasive alien species have caused extinctions around the globe and remain one of the major threats to birds and other biodiversity.”

Another wetland species suffering from the impacts of introduced aliens is Zapata Rail (*Cyanolimnas cerverai*) from Cuba. It has been uplisted to Critically Endangered and is under threat from introduced mongooses and exotic catfish. An extremely secretive marsh-dwelling species, the only nest ever found of this species was described by James Bond, a Caribbean ornithologist and the source for Ian Fleming’s famous spy’s name. And it’s not just aliens. Wetlands the world over, and the species found in them, are under increasing pressures. In Asia and Australia, numbers of once common wader species such as Great Knot (*Calidris tenuirostris*) and Far Eastern



**Great Knot** (Photo: Aviceda/Wikipedia)



Curlew (*Numenius madagascariensis*) are dropping rapidly as a result of drainage and pollution of coastal wetlands. The destruction of inter-tidal mudflats at Saemangeum in South Korea, an important migratory stop-over site, correlated to a 20% decline in the world population of Great Knot. Huge flocks of these birds once visited northern Australia, but annual monitoring by scientists have found corresponding declines in numbers.

“Wetlands are fragile environments, easily disturbed or polluted, but essential not only for birds and other biodiversity but also for millions of people around the world as a source of water and food”, said Dr. Stuart Butchart, BirdLife’s Global Research and Indicators Coordinator.

However, the Red List update shows that we now know, more than ever, that conservation works. Azores Bullfinch (*Pyrrhula murina*) has been downlisted from Critically Endangered to Endangered as a result of conservation work to restore natural vegetation on its island home. SPEA (BirdLife in Portugal) and RSPB (BirdLife in the UK) have worked together with others to turn around the fortunes of this species in what is a model for other projects. “This is a clear example of conservation action succeeding in turning the tide for a highly threatened species”, said Andy Symes, BirdLife’s Global Species Programme Officer. “Where there is commitment and financing we can save species. We have the knowledge and will, but there needs to be better funding globally to address the loss of species.”

In Colombia, Yellow-eared Parrot (*Ognorhynchus icterotis*) has also been the beneficiary of conservation. Protection of its nest sites and education programs in local communities telling people about its uniqueness has lead to a steady increase in numbers, resulting in downlisting to Endangered. “These successes show what is possible, and they point the way forward to what needs to be done by the global community”, said Dr. Butchart. “2010 is the International Year of Biodiversity; world leaders failed to stem the decline of biodiversity. We cannot fail again.” *Source: SurfBird News, 26 May 2010*

**Black Rhinos Released in Tanzania in ‘Most Ambitious’ Relocation of Mammals Ever** - Three female and two male Eastern Black Rhinoceroses (*Diceros bicornis michaeli*) were airlifted on a chartered Hercules C-130 aircraft from the South African conservancy where they were raised to Tanzania’s Serengeti National Reserve. They are the first of 32 of the animals that will be flown home to the native habitat from which their ancestors were evacuated as poachers began decades of slaughtering almost 50 years ago. The illegal trade in rhino horn in the 1960s and 1970s pushed



**Black Rhinos in Ngorongo Crater**

(Photo: Mike Zinkova/Wikipedia)

the rare species - one of 188 mammals on the international “Red List” of critically endangered animals - to the brink of extinction. From a peak population of more than 1,000 in the Serengeti area in the middle of the last century, only two females remained by 1991. Conservationists, concerned that the Eastern Black Rhinoceros would be wiped out in East Africa, had moved seven of them to South Africa in 1964, where they thrived in private game parks. The giant animals have a life expectancy of 35 years in the wild, and up to 45 in captivity. Now, they are returning home for the first time. All 32 to be sent to Tanzania over the next two years of the Serengeti Rhino Repatriation Project are direct descendants of the seven evacuated 46 years ago.

“It is the largest amount of such animals ever to be moved so far,” said Alistair Nelson, program manager for the Frankfurt Zoological Society, which oversaw the relocation. “Animals have been moved from the US to Africa, from Africa to Europe, across southern Africa and so on, but this is certainly the biggest such population.”

The operation began recently, when Piet Morkel, a veterinarian and rhino expert with long experience of using tranquilizer darts on the animals, captured the first of the 32 in their South African conservancy. Since then, they have been kept in large, specially-constructed pens. Two handlers stayed with them to help familiarize them with enclosed spaces, steadily introducing them to the



crates used during the flight, and slowly changing their fodder to that found in East Africa. Each of the 1.2 ton animals was ushered into its crate and loaded onto the Hercules for the five-hour, 1,700 mile journey home to northern Tanzania. As the sun began to dip towards the Serengeti's savannah horizon that evening, the huge airplane landed at a dirt airstrip to be met by Tanzania's president, Jakaya Kikwete at a welcome ceremony involving 500 people. Warriors dressed in serval cat and black-and-white Colobus monkey skins, wearing ostrich feather headdresses, performed traditional dances in the dust kicked up by the planes four slowing propellers.

"This is a historic day - we are welcoming home these animals in the first ever relocation of its kind in the world," said Simon Mduma, director of the Tanzanian Wildlife Research Institute.

Conservationists estimate that there are fewer than 4,300 black rhinos left alive in the wild, down from a peak of 65,000 in the middle of the 20th century. Only 33 currently live in the Serengeti ecosystem, meaning the population will have almost doubled when the current repatriation project is completed in 2012. The five that arrived on May 21, 2010, will spend the next month in a new set of special pens, called bomas, before being released into a 15-square mile enclosure ringed with an electric fence. Only after they are fully acclimatized will they be introduced fully into the wild.

"That's going to take about a year," said Brian Harris, managing director of the SingitaGrumeti Fund, a private conservation foundation bankrolled by a Wall Street financier, which paid the relocation's £4.8 million bill. "We need to keep a close eye on them as they live through a wet season, to build up resistance to the tsetse fly [which carries sleeping sickness], and a dry season, so they learn how to find water."

There is, however, still another threat. Poaching driven by increased Chinese demand for ivory has soared in east Africa in the past five years. Six black rhinos were killed for their horns in neighboring Kenya in the last 12 months, and measures have been put in place to prevent Tanzania's new arrivals from suffering the same fate. An elite force of 24 rangers, drawn largely from the Tanzanian National Parks Authority, has been specially trained to monitor the rhinos, which will have GPS chips inserted in the horns so conservationists can track them.

"If someone in the local community is going to be offered thousands of dollars to go out there and get a rhino horn, of course it's going to be difficult to stop that," said Dennis Rentsch, technical advisor for Frankfurt Zoological Society. "But if we can find ways for people to earn a living without having to come into the park to poach game meat, then there's less chance they will ever come across a rhino."

The ultimate aim, said the SingitaGrumeti Fund's Mr Harris, is to rebuild the biodiversity of the Serengeti ecosystem. "Reintroducing the rhinos and ensuring their safety from poachers will automatically protect other species sharing the same habitat," he said. "So more animals will feel comfortable here and more will come in, allowing natural processes to restore the environment."

*Source: the Telegraph, Mike Pflanz, 23 May 2010*

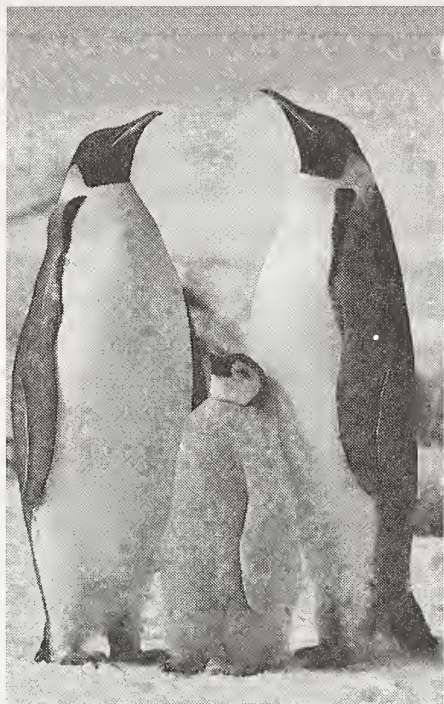
**Legal Settlement Will Protect 7 Penguin Species at Risk from Global Warming and Fisheries -** A federal judge approved a settlement that requires the federal government to finalize protections for seven penguin species under the Endangered Species Act. The court-ordered settlement results from a lawsuit filed by the Center for Biological Diversity and Turtle Island Restoration Network (TIRN) challenging the Obama administration's failure to finalize its determination that these penguins warrant Endangered Species Act protection due to threats from climate change and commercial fisheries.

"Penguins are poster children for the devastating effects of climate change," said Catherine Kilduff, a Center attorney. "The Endangered Species Act provides a springboard for protecting penguins and our planet."

In 2006, the Center filed a petition to list 12 penguin species under the Act. In December 2008, the Interior Department proposed listing seven of those penguins as threatened or endangered – African (*Spheniscus demersus*), Humboldt (*S. humboldti*), yellow-eyed (*Megadyptes antipodes*), white-flipped (*Eudyptula albosignata albosignata*), Fiordland crested (*Eudyptes pachyrhynchus*), erect-crested (*E. sclateri*), and a population of the southern rockhopper penguins (*E. chrysocome*) – while denying listing to emperor (*Aptenodytes forsteri*) and northern rockhopper penguins (*Eudyptes moseleyi*) despite scientific evidence that they are also threatened by climate change and commercial



fisheries. “Industrial fisheries and ocean warming are starving the penguins. Longlines and other destructive fishing gear entangle and drown them,” said Todd Steiner, biologist and executive director of TIRN. “Finally the government is throwing penguins a lifeline to recovery by protecting them under the Endangered Species Act.”



**Emperor Penguin Family**

(Photo: Ian Duff/Wikipedia)

This settlement guarantees protections for the seven penguin species the Interior Department proposed for listing; the Center and TIRN also intend to file suit against Interior for denying protections to emperor and northern rockhopper penguins. Warming oceans, melting sea ice, and fishery harvests have wreaked havoc on penguins’ food supply: Krill, an essential nutrient for penguins, whales, and seals, has declined by up to 80% since the 1970s over large areas of the Southern Ocean. The Endangered Species Act listing will protect penguins from multiple threats, raise awareness of their plight, and increase research funding. The Act also has a key role in managing greenhouse gas pollution by compelling federal agencies to analyze and reduce the impact of the emissions generated by their activities on listed species. Source: *Center for Biological Diversity*, 4 June 2010

**Lorises at Risk from Illegal Trade** - A study by researchers from Malaysia, Australia and the UK finds that levels of trade in Slow (*Nycticebus coucang*) and Slender (*Loris tardigradus*) Lorises is at levels that may be detrimental to their survival. Lorises are small, nocturnal primates found throughout Asia. The study, recently published in the *American Journal of Primatology*, examined the trade in Slow and Slender Lorises in Sri Lanka, Cambodia and

Indonesia and found clear cultural differences between countries in the way the animals are viewed. Surrounded by superstition, it is believed in South and Southeast Asia that eating loris flesh can treat leprosy, tonics made from lorises are claimed to heal wounds and broken bones and help women regain strength after childbirth, while in Sri Lanka Slender Loris body parts may ward off the “evil eye” and can be used to curse enemies. Finally, their tears are a secret ingredient in love potions. Every year thousands of lorises are caught to supply such uses. The animals are also in demand from the pet trade, especially in Indonesia, despite the animals possessing a toxic bite. In humans a Slow Loris bite can lead to anaphylactic shock and even death. As a result, in trade Slow Lorises often have their teeth removed.

“The tendency to freeze when spotted by humans makes lorises particularly vulnerable to collectors. Our study shows that people catch lorises any time they see them, usually while out looking for other animals. This makes the problem of the loris trade a difficult one to tackle,” said Anna Nekaris of the Nocturnal Primate Research Group at Oxford Brookes University, and lead author of the study.

The trade is also illegal: lorises are protected by national laws in every country where they occur naturally and international trade in Slow Lorises is banned through their listing in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). However, the study found that lorises are traded openly in large numbers at animal markets, especially in Indonesia and Cambodia.

“The open trade in these animals highlights a serious lack in enforcement—laws are ignored by wildlife traders who are obviously not afraid of legal repercussions,” said Chris Shepherd of TRAFFIC Southeast Asia, an author of the study. “This exemplifies the lack of seriousness in dealing with wildlife crimes, which is leading to many species becoming increasingly rare.”

Slender Lorises occur in India and Sri Lanka. Slow Lorises occur in Bhutan, India, Bangladesh, China, Myanmar, Thailand, Laos, Vietnam, Cambodia, Malaysia, Singapore, Brunei, Indonesia and the Philippines. In 2007 Slow Lorises were included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) precluding all international commercial trade; Slender Lorises have been included in Appendix II since the Convention’s inception in 1975, regulating all international commercial trade in the species. Source: *traffic.org*, 26 May 2010



**Slow Loris**

(Photo: Duke University)



**Two Groups to Sue BP Under Endangered Species Act** - Two groups say they'll sue BP PLC for killing endangered species in the Gulf of Mexico by failing to stop the oil spill and by using dispersants under water and on the surface. The Southern Environmental Law Center and Defenders of Wildlife sent BP a required 60-day notice that they plan to sue under the Endangered Species Act. Attorney Catherine Wannamaker says they want to make sure that BP is held accountable for all the losses that may occur, and for restoring endangered species. By the most conservative estimate, seven million gallons of crude have spilled into the Gulf of Mexico after a BP-operated offshore drilling rig exploded and killed 11 workers. At least three environmental lawsuits have been filed under the National Environmental Policy Act, which doesn't require prior notice. *Source: Associated Press, 25 May 2010*

**Obama Restricts Oil Drilling in Alaska, East Coast, Gulf of Mexico** - In view of the ongoing oil spill disaster in the Gulf of Mexico, President Barack Obama has extended for another six months a month-long moratorium on new deepwater drilling permits that was due to expire. At a White House press conference, President Obama also announced a suspension of oil drilling off the coast of Alaska already permitted for this summer and canceled certain lease sales off the coast of Virginia and others in the Gulf of Mexico. Obama also suspended action on 33 deepwater exploratory wells currently being drilled in the Gulf of Mexico and announced that his administration will impose "aggressive new operating standards and requirements for offshore energy companies."



**Badly oil-soaked Brown Pelicans at Grand Island, LA** (Photo: International Bird Rescue Center)

Shell Oil Company will not be permitted to drill for oil in Alaska's Beaufort and Chukchi seas this year, a decision that environmental groups have been seeking since long before the Deepwater Horizon oil rig leased by BP exploded April 20th leaving the damaged wellhead spilling oil into the Gulf.

Center for Biological Diversity Senior Counsel Brendan Cummings said, "While the decision to suspend Shell's planned drilling this summer in the Arctic is an important first step, what we really need is revocation of the improperly issued leases and permanent protection of the Arctic. The fact that no technology exists to effectively clean up an oil spill in Arctic waters will not be changed in a year's time."

The Southern Environmental Law Center commended Obama for canceling the oil and gas drilling lease sale proposed for three million acres off the coast of Virginia, but urged withdrawal of the rest of the Mid- and South Atlantic, as well as the eastern Gulf, from all future drilling plans. But the President emphasized that domestic oil production is an important part of America's overall energy mix and it will be part of his administration's overall energy strategy. *Source: Environment News Service, 27 May 2010*

**Gulf Oil Spill Likely to Hit U.S. Atlantic Coast This Summer** - Oil from the massive spill in the Gulf of Mexico is likely to extend along thousands of miles of the Atlantic coast and into the open ocean as early as this summer, according to a detailed computer modeling study released by the National Center for Atmospheric Research. The research was supported in part by the National Science Foundation, NCAR's sponsor. The results were reviewed by scientists at NCAR and elsewhere, although not yet submitted for peer-review publication.

"I've had a lot of people ask me, 'Will the oil reach Florida?'" says NCAR scientist Synte Peacock, who worked on the study. "Actually, our best knowledge says the scope of this environmental disaster is likely to reach far beyond Florida, with impacts that have yet to be understood."

The computer simulations indicate that, once the oil in the uppermost ocean has become entrained in the Gulf of Mexico's fast-moving Loop Current, it is likely to reach Florida's Atlantic coast within weeks. It can then move north as far as about Cape Hatteras, North Carolina, with the Gulf Stream, before turning east to the open ocean. Whether the oil will be a thin film on the surface or mostly subsurface due to mixing in the upper ocean is not known. The flow in the model represents the best estimate of how ocean currents are likely to respond under typical wind conditions. More model studies are underway that will indicate what might happen to the oil in the Atlantic Ocean. *Source: Environment News Service, 3 June 2010*



**Oil Spill Creates Huge Undersea ‘Dead Zones’** - The world’s most damaging oil spill – in its 41st continuously gushing day at the time of this writing – is creating huge unseen “dead zones” in the Gulf of Mexico, according to oceanologists and toxicologists. They say that if their fears are correct, then the sea’s entire food chain could suffer years of devastation, with almost no marine life in the region escaping its effects. While the sight of tar balls and oil-covered birds on Louisiana’s shoreline has been the most visible sign of the spill’s environmental destruction, many scientists now believe it is underwater contamination that will have the deadliest impact. At least two submerged clouds of noxious oil and chemical dispersants have been confirmed by research vessels, and scientists are seeing initial signs of several more. The largest is some 22 miles long, six miles wide and 3,300 feet deep – a volume that would take up half of Lake Erie. Another spans an area of 20 square miles.

More than 8,300 species of plants and animals are at risk. Some, such as the bluefin tuna (*Thunnus thynnus*), which come to the Gulf to spawn, could even face extinction. Scientists predict it will be many months – even years – before the true toll of the disaster will be known.

In previous spills, oil rose to the surface and was dealt with there, but due to the use of dispersants, as well as the weight of this particular crude oil and the pressure created by the depth of the leak, much of the oil has stayed submerged in clouds of tiny particles. At least 800,000 gallons of dispersants were sprayed at escaping oil in a frantic attempt to keep it offshore, but it now seems this preventative measure has created a worse disaster. The chemicals helped to keep the oil submerged and are toxic to marine life, resulting in unprecedented underwater damage to organisms in the Gulf. Once these harmful substances enter the food chain, almost nothing will escape their effects. Forests of coral, sharks, dolphins, sea turtles, game fish and thousands of shellfish could all face destruction. What happens next to these underwater clouds – or plumes – depends largely on the currents. If they do eventually rise to the surface, they may end up on the shoreline months or years from now, causing a second wave of destruction.



**Deepwater Horizon oil spill, May 24, 2010**

(Photo: NASA-GSFC/MODIS Rapid Response)

“It’s the biggest environmental disaster of our time and it’s not even over yet,” said the marine toxicologist Dr. Susan Shaw, director of the Marine Environmental Research Institute based in Maine. She has been diving among the damage and is horrified by the contamination caused by BP’s continued use of dispersants. “They’ve been used at such a high volume that it’s unprecedented. The worst of these – Corexit 9527 – is the one they’ve been using most. That ruptures red blood cells and causes fish to bleed. With 800,000 gallons of this, we can only imagine the death that will be caused.”

According to Dr. Shaw, plankton and smaller shrimps coated in these toxic chemicals will be eaten by larger fish, passing the deadly mix up the food chain. “This is dismantling the food web, piece by piece,” she said. “We’ll see dead bodies soon. Sharks, dolphins, sea turtles, whales: the impact on predators will be seen in a short time because the food web will be impacted from the bottom up.”

The largest of the clouds, confirmed by a University of South Florida research ship, has gone deeper than the spill itself, defying BP’s assurances that all oil would rise to the surface. It is now headed northeast of the rig, towards the DeSoto Canyon. This underwater trench could channel the noxious soup along the Florida coast, impacting on fisheries and coating 100-year-old coral forests. Tests on the toxicity of another chemical cloud, some 10 miles long and heading southwest of the site, are also being done by scientists from the University of Georgia. Marine biologists say the timing of this underwater contamination could not be more catastrophic. “This is when all the animals are reproducing and hatching, so the damage at this depth will be much worse,” said Dr. Larry McKinney, director of the Harte Research Institute for Gulf of Mexico Studies in Texas. “We’re not talking about adults on the surface; it will impact on the young – and potentially a generational life cycle.” This could wipe out more precarious species. “Bluefin tuna spawn just south of the oil spill and they spawn only in the Gulf. If they were to go through the area at a critical time, that’s one instance where a plume could destroy a whole species.” Source: *The Independent*, Emily Dugan, 30 May 2010



Name\_\_\_\_\_

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